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THE
Gauger's Practice:
OR,
The Practical Way

How to Gauge and Inch Brewers-Tuns; and the Gauging of Casks, according to the True RULES of ART.

WITH

A Table of CYLINDERS

In Ale-Gallons and Centeſſemal parts, from 8 to 60 Inches in Diamiter, and 31 Inches in Depth.

Calculated to every Tenth of an Inch in Diamiter, and to every Tenth of an Inch in Depth.

By *GEORGE WARD*, *Philomath.*

LONDON:
Printed for T. Baſſet, at the *George*, near St. *Dunſtan's* Church, in *Fleetſtreet*, 1693.

UMI

TO

The Honourable

Samuel Daſhwood, *Stephen Evance*, *John Foche* } Kts.

Francis Parry, *William Strong*, *Nathaniel Horneby*, *John Wilcoks*, *Thomas Hall*, *Thomas Aram.* } Eſq;

Chief Commiſſioners and Governours for the Management and Receipt of Their *MAJESTIES* Revenue of Exciſe within the Kingdom of *England*, &c.

THIS

Gaugers Practice

Is Humbly Dedicated, By

Your Obedient Servant,

GEORGE WARD.

To my Brethren, the Officers of Excise in *England* and *Wales.*

Gentlemen,

THese Tables of Cylinders, *and the chief things in this Tract, I composed for my own use some years ago; and have been by Officers in several Counties (since Supervisor) much solicited to put the same in Print for the good of others: I doubt not its being Serviceable, though I cannot defend it from all Critical Exceptions; yet my* Care *throughout the whole, makes me boldly warrant it free from any fundamental Errors.*

I have endeavour'd to make every thing in it as plain as words can expreſs, that it may Merit your favourable Receptions, *and be really uſeful to* You, *is the Hearty Deſire of*

Your

Affectionate Brother,

G. WARD.

The

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The

ADVERTISEMENT.

Cursus Mathematicus. *Mathematical Sciences, in nine Books, comprehending Arithmetick, Geometry, Cosmography, Astronomy, Navagation, Trigonometry, &c. By* William Leybourn, *Philomath.*

The Errata in the Tables of *Cylinders.*

Diamiter 10.8 depth 30 read 9.75, D. 8 d. 11 r. 1.96. D. 13.1 d. 26 r. 12.43, D. 23.6 d. 7 r. 10.86, D. 27.4 d. 26 r. 54.36 D. 30.7 d. 28 r. 73.50, D. 31.2 d. 11 r. 29.82. D. 35.7 d. 31 r. 110.04. D. 38.1 d. 5 r. 20.21. D. 39 d. 3 r. 12.71 D. 40.3 d. 10 r. 45.23, D. 45.8 d. 6 r. 35.05, D. 46 d. 3 r. 17.68, D. 48.3 d. 31 r. 201.42. D. 48.8. d. 1 r. 6.63. D. 49.6 d. 30 and 31 r. 205.55. and 212.41. D. 53.9 d. 12 r. 97.10, D. 47 d. 6. r. 3.69. D. 47 d. 7 r. 4. 31. D. 47. d. 8. r. 4.92, D. 47 d. 9. r. 5.53.

In page 26, in the Marginal Note, for .0034 read .0043.

Correct these in the Tables with the Pen.

DECIMAL Arithmetick

Notation of *DECIMALS.*

A *Decimal Fraction*, is that which by prefixing a Point or Prick towards the left hand, its value is decreased from ſo many Units, to ſo many tenth parts of an Unit. And if a Point and a Cypher, or Digit be prefixed, it will then be ſo many hundred parts, and if a Point and two Cyphers or Digits be prefixed, its value is decreaſed to be but ſo many thouſand parts, *&c.*

For as in whole Numbers, the *value* or *Denomination* of Places increaſes by tens from the *Units* place towards the left hand, ſo in *Decimal Fractions*, the *value* or *Denomination* of places decreaſe by tens from the Units place towards the right hand.

Alſo as Cyphers before a whole Number have no value, ſo Cyphers after a *Decimal Fraction*, are of no ſignification.

And as Cyphers before a whole Number do increaſe that Number, ſo Cyphers before a *Decimal Fraction* do diminiſh the value thereof.

EXAMPLE.

·4			*Tenth*	
·04			*Hundred*	
·004	} is	4	*Thouſand*	} Parts
·0004			*Ten Thouſand*	

Addition and *Subſtraction.*

THe Operation of *Addition* and *Subſtraction* in *Decimals*, are the very ſame as in Vulgar Arithmetick, only obſerve to place *Units* under *Units*, and *Fractions* under *Fractions*, in their own proper Ranks and Files.

EXAMPLE.

EXAMPLE.

To	745.2629	From	584.096
	84.201	Subſtract	29.92845
	2.74		
add	9.5	Rreſts	554.16755
	.8		
Tot.	842.5039		

Note, *In Addition there muſt ever be as many places of Fractions in the Total, as are found in any of the Sums to be added together.*

Multiplication.

Multiplication of *Decimals* is likewiſe the very ſame as in *Vulgar Arithmetick*, only there muſt be ſo many Figures for *Decimals* in the *Product*, as there was *Decimals* in both the *Multiplicand*, and *Multiplier*. See the Work,

Multiplicand	87.942		274
The Multiplier	5.428		.26
	703536		1644
	175884		548
	351768		
	439710	Product	7124
Product.	477.349176		

	.004	.38	8.6
	.002	.09	.00002
Product	.000008	.0342	.000172

When it happens that there are not ſo many Figures in the *Product*, as there are *Decimal Fractions* in the *Multiplicand* and *Multiplier*, then place Cyphers before the *Product*, till the Number of places be equal, as in theſe three laſt Examples.

DIVISION of *Decimals*.

Diviſion of *Decimal Fractions*, or mixt Numbers, is perform'd after the ſame manner as in whole Numbers.

EXAMPLE.

Let 29 be divided by 641.42

In this Example the Diviſor (641.42) is greater than (29) the *DIVIDEND*, therefore in this and all the like Caſes, you muſt place a competent Number of Cyphers behind the *DIVIDEND*, which if it be a whole Number, then the Cyphers ſo placed muſt be *diſtinguiſhed* therefrom as Fractions, as here I put 6 Cyphers behind 29 and place the Number thus.

641.42) 29.000000 (.0452

25 6568

3 34320
3 20710

136100
128284

The 7816 remain

Then proceed to the Diviſion as if all were whole Numbers, and to know the value or Denomination of places in the Quot. is the only difficulty: For the Reſolving of which there are ſeveral Rules, but the moſt General and Infallible Rule is this.

The firſt figure in the QUOTIENT, muſt be of the ſame Denomination with that figure in the DIVIDEND, which ſtands (*or is ſuppoſed to ſtand*) **over the Units place in the Diviſor.**

Therefore place your *Dividend* and the *Diviſor* thus, as it ought to ſtand if it were to be ſubſtracted, and you will ſee the Cypher in the *Dividend*, which ſtands over the Units-place in the *Diviſor*, is the place of hundredths.

29.000000
641.42

There-

Therefore according to the *Rule* given, the first Figure in the *Quot.* must be of the same Denomination, *viz.* of hundredths; therefore put a prick and a Cypher before it, and the *Quot* will be .0452.

In dividing of whole Numbers or mixt, if there happen to be any Remainder, you may bring down more Cyphers, and by continuing your Division, carry the Quote to as many places of Fractions as you please.

And by these following Examples, you will thorowly understand *Division* of *Decimals*.

Divide 29 by 6.4142

```
                    6.4143) 29.000000(4.52
                                 ...
                            25 6568
                            -------
                             3 34320
                             3 20710
                             -------
                              136100
                              128284
                              ------
                                7816

          29.000000
           6.4142
```

Here by the General Rule, the first Figure in the Quot is Unit;

Divide

Divide 29 by .64142

```
.64142) 29.000000 (45.2
        25 6568
        -------
         3 34320
         3 20710
         -------
           136100
           128284
           ------
             7816

29.000000 (
 .94142
```

Here the first Figure in the Quot. is tens in whole Numbers; because the supposed Units-place stands under the place of tens in the Dividend.

Divide .000000441 by .000542

```
.000542 ) .000000441 ( .0008
                 4336
                 ----
                   74

.000000441 (
     .000542
```

Here the first Figure in the Quot. is the fourth place of Decimals, because the supposed Units-place

place ſtands under the fourth place of Decimals in the Dividend, therefore put a Prick and three Cyphers before it, and the Quote will be .0008

Divide 644 by .04

```
.04) 644 (161
     ..
     4
     24
     24
       4
       4
       0
```

```
 644          (16100
.04           The true Quot.
```

Here by the General Rule the firſt Figure in the Quot. is tens of thouſands, (of whole Numbers) becauſe the ſuppoſed *Units*-place ſtands under the place of tens of thouſands in the *Dividend*, ſo after the Diviſion add two Cyphers to the Quot.

When any Number either *Decimal* or *Mixt*, is to be divided by an Unit with Cyphers, as 10, 100 or 1000, *&c.* Only remove the Prick in the *Dividend*, ſo many places towards the left hand, as there are Cyphers with the Unit.

Thus 875.4 divided by 10 is 87.54, divided by 100, it will be 8.754, by 1000, is 8754, and if by 10000, the Quot. will be .08754

Note,

Note, That the true *Proof* of DIVISION is by MULTIPLICATION, and the true *Proof* of MULTIPLICATION is by DIVISION.

Reduction of *Decimals.*

A Vulgar Fraction is reduc'd into a Decimal, by poſtponing to the *Numerator* a competent number of Cyphers, and dividing it by the Denominator.

Which Quot. will be a Decimal Fraction, equal in value to the Vulgar Fraction given: So ¾ (of any thing) Reduc'd as aforeſaid will be .75

EXAMPLE.

4) 3.00 (.75
28
20
20
00

Note, *That the odd parts of an Integer cannot be exactly Reduced to a* Decimal, *for there will generally be a* Remainder, *in ſuch Caſes carry on the* Decimal *to 5 or 6 places, and it will be very near the truth.*

EXAMPLE

7) 5.00000 (.71428
.....
49
10
7
30
28
20
14
60
56
4

To give the *Decimal* of Shillings.

Divide the Number given by 20, (the ſhillings in a Pound,) and the *Quot.* will be the *Decimal* required.

To give the Decimal of Pence, divide the Number given by 240, (the Number of Pence in a Pound,) and the Quot. is the *Decimal*

To give the Decimal of Farthings, divide the Number given by 960. (the number of Farthings in a Pound,) and the Quot. is the *Decimal*.

How

How to Reduce the *Decimal Fraction*, to the known parts of the *Integer*, as the *Decimal* part of a pound *Sterling*, *&c.*

EXAMPLE.

.745 the Decimal part of a Pound
20 muſt be Multip. by 20 the ſhil. in a Pound.

Shil. 14.900
12 Pence in a ſhilling.

Pence 10.800
4

Farth. 3.200

.75 A Decimal part of a Foot
12 multiplied by the Num. of Inch. in a Foot

150
75

9.00 brings out Nine Inches.

DEFINITION.

THe *Extracting* of the *Square-Root* of any Number, is the finding out another Number, that being squar'd (or Multiplied by it self.) The *Product* is equal to the Number first *propounded.*

Square-Numbers are either *single* or *Compound.* Single are those whose *Roots* consist only of one Figure, (as in this *Table.*) *Compound* are all those above 100.

Square Num	1	4	9	16	25	36	49	64	81
Sides or *Roots*	1	2	3	4	5	6	7	8	9

The Number of these Points shews the Root, or how many Figures will be in the Quot. and the Reason why every second Figure is Pointed; because the Square of the greatest Number under 10, *can consist but of two places.*

The Number *given* to be *Extracted*, First Point the Units-place with a Period, and so Successively every second Figure: But in *Decimals* you must point from the Units-places towards the right hand, and if the places are odd, postpone a Cypher to make them even.

EXAMPLE.

Extract the Square Root of 52434

```
. . .
52434(2
4
-
1
```

Firſt obſerve what is the greateſt *Root* in the firſt Period towards the left Hand, which you will find here to be 2 *(*and its *Square* is 4*)* place it in the Quot. Then the Square of 2 is 4, which Subſtract from 5 the firſt period, the remainder is 1, which place underneath. (*This is the firſt Work, and no more to be repeated.)*

```
. . .
52434(2
4
-
124
```

Then to this Remainder Poſtpone the next Period (which are always 2 Figures) forthe *Dividend* and the *Example* will ſtand thus.

```
. . .
52434(2
4
-
124
```

Then

Then double the Quot. (which here makes 4) for a new *Diviſor*, which muſt be placed ſhort of the place of Unity (as here you ſee.)

```
. . .
52434(22
4
---
124
 42
```

Then ſay how oft can I have 4 in 12. I can have 3 times; but that will be too much, therefore I can have it but 2 times; which 2, place in the Quot. as here you ſee; and likewiſe place it after the Diviſor 4.

```
. . .
52434(22
4
---
124
 42
 84
---
 40
```

Then Multiply the ſaid 42, by 2, (the laſt root) and Subſtract the Product as in *Diviſion:* Thus 42 Multiplied by 2 is 48, which Subſtracted from 124, the remain is 40.

```
. . .
52434(22
4
--
124
 42
 84
----
4034
 44
```

To which Poſtpone the next Period for a new *Dividend*, and Double the Quot. for a new *Diviſor*, and work the ſame way as in the laſt Period.

And if a long Sum of a great many *Periods* were to be *Extracted*, the ſame work is to be obſerved till the whole Extraction is finiſhed.

```
. . .
52434(228
4
--
124
 42
 84
----
4034
 448
3584
----
 450 Remain.
```

And if at any time there be a Remain after the *Extraction*, then add as many pairs of Cyphers as you pleaſe, and *Extract* as before. And as many

many pairs of Cyphers as you uſe, ſo many places of *Decimals* will be in the *Root*. In this Example there remains 450.

```
. . .
52434(228.98
4
---
124
 42
 84
---
4034
 448
3584
----
45000
 4569
41121
-----
387900
 45788
366304
------
 21596
```

To which here I have Poſtpon'd two pair of Cyphers, which makes two *Decimals* in the Root, and might have wrought to a great many more *Decimals* by a continual Poſtponing of pairs of Cyphers.

But if the *Diviſor* at any time exceeds the particular *Dividend*; then you muſt place a Cypher in the *Quot.* and to the *Dividend* Poſtpone another *Period*

Period (if there be any) or a pair of Cyphers; and if that will not do, then add another Cypher to the *Quot.* and poſtpone another Period, or pair of Cyphers, as in this following Example.

Extract the *Square Root* of 3610

3610(6	3610(6	3610(60
36	36	36
—	—	—
	10	1000

Here the greateſt Root of the firſt Period is 6, which place in the Quot. then the Square of 6 is 36, which Subſtracted from the Period, remains nothing. Then take down the next Period, which is but 10, then double the *Quot.* for a New *Diviſor*, and it will be 12, which is above the *Dividend*; therefore place a Cypher in the *Quot.* and poſtpone a pair of Cyphers to the *Dividend.*

3610(60.0	3610(60.28
36	36
—	—
100000	100000
1200	12028
	96064
	———
	3936

Yet the *Diviſor* is too big for the *Dividend*, therefore place another Cypher in the *Quot.* and a pair

of Cyphers to the *Dividend*, and double the *Quot.* for a New *Diviſor.*

Note, That ſo many Periods as there are in the *Dividend* of whole Numbers, ſo many places of whole Numbers in the *Quot.* and as many Periods of Decimals in the *Dividend*, ſo many Decimal figures in the *Quot.*

To prove the *Extraction*, ſquare the Root (or Quot) to which add the Remain (if any be) and if it make the ſame of the Dividend, the Extraction is right; otherwiſe not.

THE

THE

Gauger's Practice.

GAUGING.

GAUGING is an Art which cannot be underſtood well without *Decimal Arithmetick* and *Geometry*. Therefore he that would be a Compleat *Gauger*, muſt have ſome competent Skill in both.

In *Decimal-Arithmetick* he ought well to underſtand ADDITION, SUBSTRACTION, MULTIPLICATION, DIVISION, and the Rule of PROPORTION.

In *Geometry* he ought to know the Three ſorts of of *QUANTITY*; that is, a LINE, a SUPERFICIES, and a SOLID.

A Line hath Length, but no Breadth; a Superficies hath Length and Breadth, but no Depth; a Solid hath Length, Breadth and Depth. And there is no kind of *Quantity* but is meaſurable by ſome common Meaſure, as a Line is meaſured by a Line of Inches, or Feet, *&c.* a Superficies is meaſur'd by a Superficies, as one Square Inch, or one Square Foot, *&c.* and a *Solid* is meaſured by a *Solid*, as one Cubical Inch, or one Cubical Foot, *&c.*

So when it is known, how many Inches or Feet are contained in a Line, the length of that Line is ſaid to be known; and when is is known how many Square Inches or Feet are contain'd within any Superficies, the Content, or Area of that Superficies is ſaid to be known; and alſo when it is known how many Solid or Cubical Inches are contain'd in any Solid, the Content of that Solid is likewiſe ſaid to be known.

And likewiſe 'tis convenient, before the Entring upon *Gauging*, firſt to underſtand the Meaſures of BEER, ALE and WINE now uſed in *England*, and to know what the Primitive Meaſure is, and its Capacity, that thereby may be known the Names and Capacities of thoſe which are Derivative.

Firſt,

First, *Note*, That the Beer or Ale-Gallon, now in use, contains 282 Cubical Inches, and the Wine-Gallon contains 231 Cubical Inches; also the Corn Gallon, or Dry Gallon, contains 272¼ Cubical Inches.

A Table of Beer-Measure.

Names of Beer-Vef.	*Cubical Inches.*	*Pints*	*Quarts*	*Gallons*	*Firk*	*Kil*	*Bar*
Barrel	10152	288	144	36	4	2	1
Kilder.	5076	144	72	18	2	1	
Firkin	2538	72	36	9	1		
Gallon	282	8	4	1			
Quart	70½	2	1				
Pint	35¼	1					

A Table of Ale-Measure.

Names of Ale Vess.	*Cubic. Inches.*	*Pints*	*Quarts*	*Gall.*	*Firk.*	*Kild.*	*Bar.*
Barrel	9024	256	128	32	4	2	1
Kilder.	4512	128	64	16	2	1	
Firkin.	2256	64	32	8	1		
Gallon	282	8	4	1			
Quart	70½	2	1				
Pint	35¼	1					

A Table of Wine Measure.

Names of Wine Veſ.	*Cubical Inches*	*Pints*	*Quarts*	*Gallons*	*Runlets*	*Hogſhe.*	*Tercions*	*Pipes*	*Tuns*
A Tun	58212	2016	1008	252	14	4	3	2	1
Pip. or But	29106	1008	504	126	7	2	1½	1	
Tercion	19404	672	336	84	4⅔	1⅓	1		
Hogſhead	14558	504	252	63	3½	1			
Runlet	4158	144	72	18	1				
Gallon	231	8	4	1					
Quart	57¾	2	1						
Pint	28⅞	1							

A

A Table of the Dimensions of several Wine and Beer Vessels used in *England*, with their Contents in Gall. and Cubical Inches.

Names of Wine Vef.	Head Inches 100 Parts	Bung. Inches 100 Parts	length Inches 100 Parts	Solid Content. W. Gal.	A. Gall.	Cubic. Inches
Raw. Fat	31.15	42.32	70.50	360.00	295.00	83160
T. of wine	38.50	42.20	44.00	252.00	206.25	58212
Tun of oil	36.00	42.00	40.80	236.00	193.50	54516
Canarp P.	21.82	28.65	48.50	116.40	95.40	26888
Bran. hog.	22.70	25.80	33.50	70.00	57.30	16170
A Tercion	23.00	27.00	36.40	84.00	68.80	19404
Grav hog.	22.42	25.40	31.20	63.34	51.80	14631
H.C hogsh	21.20	23.58	30.82	54.55	44.70	12601
A Terce	16.26	18.30	34.60	42.00	34.30	9702
A Runlet	15.70	17.30	30.70	29.47	24.10	6808
Beer Vef.						
A But	25.00	31.00	46.00	131.80	108.00	30450
Puncheon	23.60	28.30	36.00	77.80	72.00	20304
Hogshead	22.00	26.00	32 00	66.00	54.00	15228
Barrel	20.20	23.00	27.00	44.50	36.50	10152
Kilderkin	16.10	18.59	21.00	22.30	18.30	5076
Firkin	12.80	14.70	16.60	11.12	9.11	2538
Gallon	7.70	8.50	5.46	1.22	1.00	282
Ale Vessels						
A Barrel	19.40	22.00	26.20	39.75	32.55	9024
Kilderkin	15.40	17.60	20.80	20.00	16.40	4522
Firkin	12.20	14.00	16.40	10.00	8.18	2256

To find the Area, or Content of a Cooler, Back, or Tun, in the Form of a Square.

The Rule is,

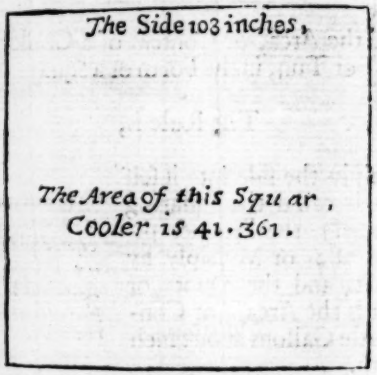
Multiply the ſide into it ſelf (which is call'd the Squaring a Number) the Product divide by 282, or Multiply by .0035461, and the Quot. or Product is the Area, or Content in Ale Gallons at one inch in Depth.

To make a Multiplier to ſerve inſtead of a Diviſor, divide an Unit by the Diviſor, and the Quot. will be the Multiplier. Thus this Number was made, viz. .0035461

According to the Rule, Multiply the ſide 108, by 108, and the Product is 11664, which divide by 282, and the Quot. will be 41 Gallons. But in the Diviſion, if a Fraction remain, as in this Example, add 3 Cyphers to it, and ſtill divide by 282 and the Quot. will be the thouſandth parts of a Gallon.

A Square is a Figure conſiſting of Four equal ſides, and Four Right Angles, like the Face of a Dye, or this Figure; and a Cube is a Solid erected on ſuch a Plain or Baſe.

See the Work.



If you would have the Area in Wine Gallons, divide by 231, or multiply by .0034.

The fide 108
108

864
108

Product 11664

282)11664(41 Gallons
1128

384
282

102

282)102 000(361 parts
846

1740
1692

480
282

198

The

The Area, or Content upon one Inch in Depth of this Square Cooler 41 Gallons, and 361 parts, the Gallon being divided into one thousaud parts.

Or thus:

108
108

864
108

Product 11664
Multiplied by .0035461

11664
69984
46656
58320
34992

41.3617104

It makes the very same as before, cutting off 7 places, or Figures, for the Decimal.

If this Square Cooler be 9 Inches deep in worts, what's the whole Content in Ale Gallons?

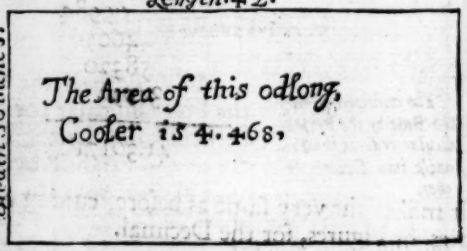
Multiply 41 361 (the Area found) by the depth (9 Inches) shews the whole Content of the Worts to be 372.249. Gall.

To find the Area, or Content of a Cooler, or Tun in the Form of an Oblong, or long Square.

The Rule is,

A Parallelogram is a long, or plain Square, and a Parallelopipedon is a Solid Figure, erected upon that plain.

Multiply the Length by the Breadth, and the Product multiply by .0035461, or divide by 282, gives the Area, or Content upon one Inch in Depth in Ale Gallons, and that multiplied by the Depth, produces the whole content in Ale Gallons.



Length 42		
Breadth 30	282)1260(4 gall.	
Product 1260	1128	
	132	

282)132.000(.468 parts
1128
1920
1692
2280
2256
24

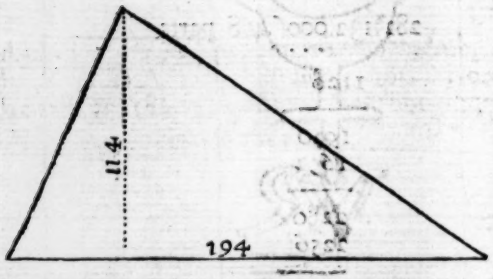
To find the Area, or Content of a Back, or Cooler, in the form of a Triangle.

The Rule is,

The multiplying half the Base by the Perpendicular reduces the Triangle into Square Inches.

Multiply half the Base by the Perpendicular (or half the Perpendicular by the Base) and divide the Product by 282, or multiply by .0035461, and the Quot. or Product, is the Area, or content in Ale Galions, at on Inch in depth.

The



Note, That all manner of Triangles are measured by this General Rule.

The Perpendicular is 114
Half the Base is 87

798
912

The Product is 9918

282)9918(35 gallons
846
1458
1410
48

282)48000(.17 parts
282
1980
1974
60

So the Area or Content upon one inch in Depth of this Triangular Cooler is 35. Gall. 17. Parts, the Gallon being Divided into an hundred parts.

Admit

Admit this Triangular Cooler be 8 Inches deep in worts; Multiply the Area by 8, the Depth, and the Product will be 281. 36. Parts the whole Content of worts therein.

Area 35.17
Multiplied by 8

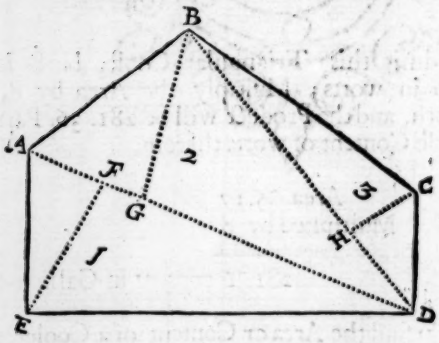
281.36 content in Gall.

To find the Area or Content of a Cooler, Back or Tun, if it be in the form of a Trapezia, or of any other irregular form, like this Figure.

A Trapezia is a Figure consisting of 5 unequal sides and Angles, and is composed of Triangles; and the Triangles are less by two than the number of Sides, and the Diagonals are less by three.

First divide it into Triangles, and then let fall a perpendicular Line in every Triangle: Then find the Area of every particular Triangle; (as in the last Example) and add the Area of every Triangle together into one Sum, and the Total is the Area, or whole Content, upon one Inch deep of a Cooler, in this Form.

To



To make it into Triangles, take ſuch a Line as Carpenters uſe, and Chalk the line very well, and with Compaſſes or a Nail faſten one end at D, then draw the line ſtreight to B and ſo ſtrike out the Diagonal, or line D. B. And keeping ſtill the line fixt at the point D; In like manner ſtrike out the line D. A.

Then Meaſure the two Diagonals, or Lines, with a Gauging Rule, and the line D. A. Will be 54. inches; And the Line D. B. 42.

Then to find the perpendiculars (in theſe Triangles) faſten the Chalked Line at E and draw it ſtreight to the Baſe D. A. And ſo ſtrick out the perpendicular E. F. Then faſten the Line at the point B, and ſtrike the perpendicular B. G. Laſtly faſten the Line at the point C. and get the perpendicular CH: Then with your Rule Meaſure every perpendicular, as you did the Diagonals.

So

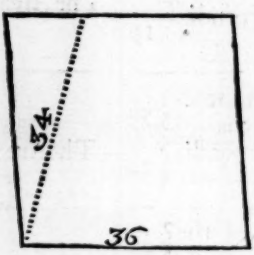
Inches		Ale Gall.
So the Base of the first Triangle is — 54 And its perpendicular is — 19	The Area	1.819
The Base of the second Triangle is 54 And its perpendicular — 24	The Area	2.297
The Base of the third Triangle is — 42 And its perpendicular — 13	The Area	0.968
So the Area, or Content, upon one Inch of Depth of this Trapezia, or irregular Cooler, is 5 Gallons, and .084 parts.	Total Sum	5.084

To find the Area, or Content of a Cooler, or Tun, in the Form of a *Rombus*, or a *Romboides*.

First, let fall a perpendicular Line from one of the *Obtuse*, or *Blunt Angles*, upon the opposite side; Then multiply the side by the perpendicular, and the Product multiply by .0035461. or divide by 282, gives the Area, or content

A Rombus *is a Geometrical Square, bent awry, having Four equal sides, but no Right Angles; yet the opposite Angles are equal, viz. two obtuse, and two acute.*

tent, upon one inch, in Ale Gall. And that multiplied by the Depth, produces the whole content In Ale Gall.



The ſide of the *Rombus* 36
Its perpendicular——34

144
108

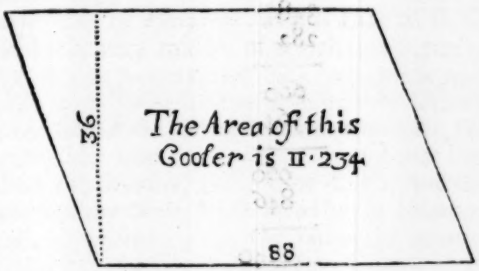
1224

282)1224(4 gallons
1128
96

282(96.000(34 parts
846
1140
1128
120

So

So the Area of this *Rombus* is 4 Gallons, and 34 parts.



	Inches
The side of the *Romboides*	88
The perpendicular	36
	528
	264
Product	3168

A Romboides *is a long Square, or* Parallelogram, *out of Square at the ends, being of unequal Sides and angles, yet the opposite sides and angles are equal. And the Content is found by the same Rule that the* Rombus *is done by.*

Gall.
282)3168(11.234 parts
282
348
282
660
564
960
846
1140
1128
12

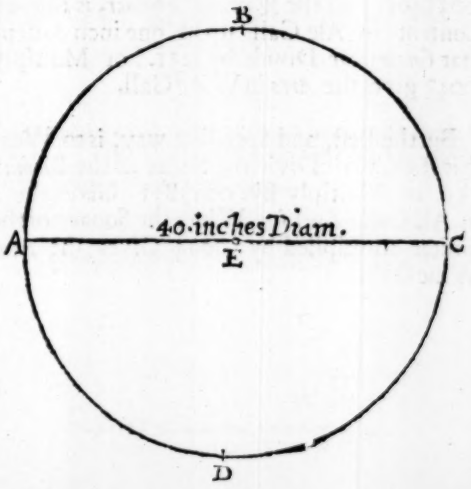
Gall.
The Area 11.234
The Depth 14 Inches
44936
11234
157.276

The whole content is 157 gallons, and 276 parts, the gallon being divided into a thousand parts.

To

To find the Content of a CIRCLE.

A CIRCLE is a plain Figure comprehended, or bounded by one Line, which is called the *Circumference*, or *Peripheria*, as this Line A. B. C. D. within the very middle of which line there is a *point*; And that *point* is called the *Center*, as the *point* E; And through which *Center* a right line, Drawn from one side of the *Circumference* to the other, Divides the *Circle* into two equal parts, and that line is called the *Diamiter*, as the Line A. C. And the two parts of the *Circle*, So Divided by the *Diamiter*, are called *Semicirles*: And the half of the *Diamiter* is called the *Radius*, or *Semi-diamiter*.



A *Cord* is a right Line, reaching from any part of the *Circumference* to the other Dividing the *Circle* into two unequal parts: A *Segment* is any part of a *Circle* Comprehended by the *Circumferenee*, Cut by a *Cord Line*, not touching the *Center.*

Admit the *Diamiter* of this *Circle* be 40. Inches, what's the *Area* in *Ale*, or *Wine* Gallons?

The Rule is,

Square the *Diamiter*, then Multiply that *Square* by 11, and Divide the *Product* by 14. and the *Quot* will be the Area in Square Inches: Then *Divide* the *Square* Inches by 282. Or Multiply by .0035461. and the *Quot*, or *Product*, is the *Area* or Content in Ale Gall. upon one inch of depth in that *Circle*: Or Divide by 231. or Multiply by .0043 gives the *Area* in Wine Gall.

But the Beſt, and Speedieſt way, is to Work by this *Rule*, viz. Divid the Squar of the *Diamiter* by 359. or Multiply by. 0027851. Gives the Area in Ale Gall. And for Wine, the Square of the Diamiter multiplied by .0034 Gives the Area in Wine Gall.

EX-

EXAMPLE.

Diamiter 40 inches
40
Squar'd 1600

359)1600(4 gall.
1436
164

359)164.000(.456 parts
1436
2040
1795
2450
2156
294

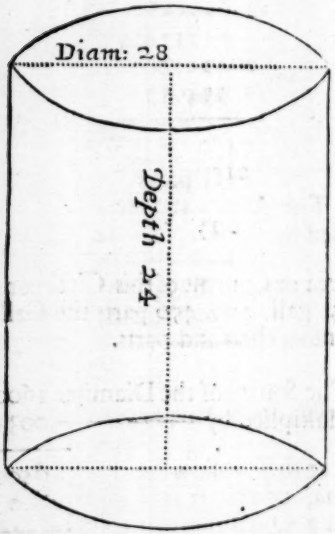
The Area or Content of this Circle one inch in depth is 4. gall. and. 456 parts the Gallon being Divided into a thousand parts.

The Square of the Diamiter 1600
Multiplied by——————.0034
6400
4800
W.G.parts
The Area is——————5.4400

If

If a Cooler or Tun, in the form of a Cylinder and the Circles above and below being of Equal Diamiters. *To find the Content thereof*; Only get the Area of the Diamiter, as I have shewed in the Circle; And multiply the Area by the Depth, or such parts as you desire, and the Product will be the Whole Content, or part respectively.

EXAMPLE.



Di-

Diam. 28
28
224
56
The Square——784

A Cylinder *is a Solid Body, with Sides erected, perpendicular on the Circumference of a Circle.*

.0027851
784
111404
222808
194957

A. G. parts
The Area 2.1835184
Multiplied by the Depth—24

87340736
43670368

A. G. parts
The whole cont. is 52.4044416

Obſerve theſe following *Propoſitions* in order to *Cyclometria*, or the true *meaſuring* of a *Circle*; uſeful when a Queſtion requires great exactneſs.

I. By the Diamiter to find the circumference? Multiply the Diamiter by 3.1416 *gives the circumference.*

II. By the circumference to find the Diamiter? Divide the circumference by 3.1416. *gives the Diamiter.*

III. By the Diamiter to find the Side of a ſquare equal? The Rule is, Multiply the Diamiter by .886227 *Gives the ſide of a ſquare Equal.*

IV. By the Diamiter, to find the Area? Divide the ſquare of the Diamiter by 1.27324 *gives the Area, in ſquar inches.*

V. By the circumference to find the Area? Divide the ſquare of the circumference by 12.5664 *Gives the Area, in ſquare inches.*

VI. By the Area to find the Diamiter? Multiply the Area by 1.27324, *and Extract the ſquare Root, gives the Diamiter.*

VII. By the Area to find the circumference? Multiply the Area by 12.5664, *and Extract the Square Root gives the circumference.*

How to find the Content of a GLOBE, or SPHERE.

Always obſerve, when the Diamiter is Given to find the Cicumſerence, or having the Circumference to find the Diamiter by theſe laſt Rules.

EXAMPLE.

A Globe whoſe Diamiter is 12 inches, what's the ſuperficial Content round about? *The Rule is,* Multiply the Diamiter by the Circumferenee, and the Product is the Superficial Content.

Thus

Thus the Diamiter being 12. inches, which Multiplied by 3.1416 ſhews the Circumference to be 37.6992. which multiplied by the Diamiter, and the Product will be 452.3904 the Superficial Content thereof.

See the work.

	3.1416
	12
	62832
	31416
The Circumference ——	37.6992
Multiplied by the Diamiter —	12
	753984
	376992
Is the ſuperficial content	452.3904

To find the Solid Content of the *Globe* or *Sphere.*

Multiply the Superficial Content by one Sixth part of the Globe's Diamiter, and the Product is the Solid Content.

	Inches ſquare
The Superficial Content is	452.3904
Multiplied by the one Sixth part of the Diam.	2.
The ſolid Cont. in Cube inches	904.7808

Another way: Cube the Globe's Diamiter, then multiply that Cube by 11. and divide the Product by 21. and the Quot. will be the Solid Content.

Or thus; Cube the Diamiter, then Multiply the Cube by .5238 (the Solidity of a Globe whose Diamiter is 1) and the Product shall be the Solid Content.

Diamiter 12
12

24
12

144
12

288
144

Cubed 1728

The Cube—1728
Multipl. by .5238

13824
5184
3456
8640

The Solid Content 905.1264 near as before.

If

If it be Desir'd to know how many Ale Gallons are Contain'd in this Globe? Divide 905.1264 the Cubical Inches therein, by 282. and the Product is the whole Content in Ale G.

A.G. parts

282)905.1264(3.2096

846

591

564

2726

2538

1884

1692

192

The whole Content is Three Gallons, and almost a Quart.

To Measure an Elipsis, *or* Oval.

In the Measuring of *Elipsis*, a mean proportion *Geometrical*, between the Longest and Shortest *Diameters*, is the Diameterof a *Circle*, equal in *Area* to the *Elipsis*.

Admit the Transverse or longest Diameter be 40 *Inches, and the Conjugate or shortest Diam. be* 30 *Inches.*

The Rule is:

Multiply the *Transverse* by the *Conjugate*, and the *Square Root* of the Product is the true *Diamiter* of a *Circle*, equal to the *Elipsis* or *Oval*. See the work,

The Square Root extracted.

The Transverse 40
Multiplied by the Conjugate 30 } Inches.
The Product 1200

```
 : :
1200 (34.64
 9
 ---
 300
  64
 ---
 256
 ----
 4400
  686
 ----
 4116
 -----
  28400
   6924
  -----
  27696
    704
```

Here 34. 64 is the true mean Diameter of an *Eliptical*, or *Oval Tun*, whose Longest Diam. is 40 Inches, and the shortest 30.

Now having reduced this *Eliptical-Tun*, into a *Circular*; the *Area*, or whole Content is found as in the Cylinder; An Example is needless.

But for Practice, in small-Eliptical, or *Oval-Tuns*, where the Longer and Shorter Diameters differ but a little; add them together, and take the half for a mean Diameter. *For Practice.*

How

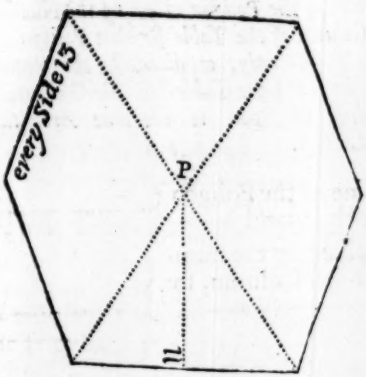
How to find the *Area* of a *Tun*, or *Back*, in the form of a *Regular-Poligon.*

The Rule is,

Regular Poligons taken ſtrictly, are ſuch as have more Sides and Angles, than 4, and are all equal, as the Pentagon, Hexagon, Heptagon, &c.

Multiply the half ſum of the Meaſures of all the ſides, by the meaſure of the line drawn from the Center to the middle of any one ſide, and the Product ſhall be the Superficial Content, in ſquare-inches, which, Multiplyed or Divided by the proper Multiplier or Diviſor, in this following Table, gives the Content, or Area in Ale Gallons upon one inch of depth.

Now to find the Center; do thus, if the ſides of the Figure are even, draw a Line from any Angle to the oppoſite Angle, and cut it again, the interſection of thoſe two lines is the Center: But if the ſides are odd, draw Lines from the middle of any two ſides being odd, to the oppoſite Angles, and the interſection of thoſe Lines ſhews the Center. Example.



A *Tun*, or *Cooler*, in the form of a *Hexagon*, as this six sided Figure, every side being 13 inches, and from the Center to the Middle of any one of the sides, 11 inches, what's the Area thereof in Ale Gallons.

Six times 13, is 78, the half of which is 39, multiplyed by 11, (the perpendicular, or Radius falling from the Center to the Middle of any side,) and the Product is 429, which multiplyed by .0092130 (the Multiplyer for a Hexagon) and the Product is 3.852377 the *Area* in Ale Gallons.

Or thus, most exactly; Multiply the Square of one of the sides, of the Poligon given, by the Number in the first Column of the Table for that Poligon; and the Product Multiply, or divide by the proper Numbers in the same Table for Ale Gallons, and the Product or Quot. is the true Area thereof in Ale Gallons.

The side of the Poligon is 13, which squar'd is —— 169

Multiplyed by the number in the first Column, for a Hexagon —— 2.59808

2338272
1558848
259808

The Product, or Area in Inches —— 439.07552
The Multiplyer for Ale Gallons —— .0092130

1317226560
43907552
87815104
3951167968

4.045202765760

So the Area is four Gallons and .045 parts of a thousand, being almost a fifth part of a Gallon more than the Area is, by the other way of working.

Admit

Admit this *Hexagon Tun* be 10 inches deep in Worts, What's the whole Contents?

Multiply the *Area* found, by 10 inches the depth, and the *Product* is the whole Content.

Area 4.045
Mul. by 10

The whole Cont. ---40. 450

A Table of Multipliers and Diviſors for Regular POLIGONS.

Poligons.	*Multipliers for Inches.*	*Multipliers for Ale Gall.*	*Diviſors for Ale Gall.*
Trigon	0 .43301	.0015355	651.250
Tetragon	1 .00000	.0035461	282.000
Pentagon	1 .72048	.0061010	163.908
Hexagon	2 .59808	.0092130	108.542
Heptagon	3 .63391	.0128863	77.602
Octagon	4 .82843	.0171221	58.404
Eneagon	6 .18183	.0219215	45.617
Decagon	7 .69420	.0272844	36.650
Hendegagon	9 .36566	.0332155	30.110
Dodecagon	11.19617	.0307030	25.187

To find the Content of a Piramid.

A *Piramid* is a *Solid*, having one right lined Baſe (either *Triangular*, *Round*, *Square*, or *Oblong*, &c) from which it decreaſeth equally leſs and leſs, till it end in a *point* at the *top* or *Vertix*: Alſo in the Peripetaſma a right line may be every where applyed from the *Baſe* to the *Vertex*; And under this Definition is comprehended a *Cone*, which is only a round Piramid.

By the *Area* of the Baſe of a PIRAMID, and its *Altitude*, or height; to find the *Solid Content*?

The *Rule* is,

Multiply the *Area* of the *Baſe* by one *third* of the *Altitude*; and the Product is the *Solid Content.*

Admit the *Baſe* of a *Square Piramid* be 48 inches. The Area thereof is	Gall. 8. 17
And the Altitude 90 inches, whoſe third part is	30
The *Piramids* ſolid Content in Ale Gall.	245.10

Admit

Admit the *Diameter* of a *Cone's Baſe* be 48 inches. Then the *Area* thereof is ——— } 6. 42
One third of 90, the *Altitude* is ——30

192.60

The *Cone's* ſolid Content, is one hundred ninety two Ale Gall. and ſix tenths

By the *Altitude* and *Baſe*; to find the *HYPOTHENUSE.*

To the Square of the *Altitude*, add the Square of half the *Baſe*, and the *Square Root* of the ſum is the *Hypothenuſe*, or ſlant height.

The *Altitude* 90, ſquar'd is ——— 8100
Half of the *Baſe* 24, ſquar'd is ——576

Total Sum. 8676

The Square Root of 8676 is 93.145 the *Hypothenuſe.*

By the *Hypothenuſe* and *Baſe*; to find the *Altitude*, or perpendicular height.

From the Square of the *Hypothenuſe* ſubduct the Square of half the *Baſe*; and the Square-Root of the remain, is the *Altitude*, or *perpendicular height.*

This Rule will find the Perpendicular height in leaning Tuns, and may be of good uſe ſometimes.

By

By the *Hypothenuſe* and *Altitude*, to find the *Baſe*.

From the Square of the *Hypothenuſe*, Subduct the Square of the *Altitude*, and the Double of the Square-Root of the remain, is the *Baſe*.

There is a Brewer's *TUN*, whoſe *Baſes* are *Rectangular parallelograms*; unequal, but parallel (and therefore called the *Fruſtum* of a *Piramid*,) Whoſe *Length* of the greater *Baſe* is 84 Inches, and the *Breadth* 68, the Length of the *Leſſer* Baſe 69 inches, and the *Breadth* 58; And the *Depth* of the *Tun* 27 Inches: How many Ale Gallons will this Tun contain?

This is the GENERAL RULE for all Tuns of this ſort.

Take the Area of the greater Baſe, the Area of the Leſſer, and a Geometical Mean betwixt the two Area's; the ſum of theſe three multiplyed by one third part of the Tuns depth, gives the Content.

EX-

EXAMPLE.

Multiply 84, the Length of the greater *Base*, by 68, the Breadth and Divide by 282,

672 gives the Area of the greater *Base*,
504
Gall.
282) 5712 (20. 25 Area
564
720
564
1560
1410
150

Multiply 69, the Length of the Lesser Base, by 58, the Breadth and Divide by 282, will give 14. 19 Gallons.

To find a *Geometrical mean*, multiply one Area by the other, and *Extract* the Square *Root*, gives a *Mean* betwixt the two Area's.

20.25
14.19

18225
2025
8100
2025

287. 3475 (16. 95, *The Geometrical Mean*

1

187
26
156

31.34
329
2961

17375
3385
16925

450

Area

	Gallons
Area of the Greater Base is	20.25
Area of the Lesser Base is	14.19
The Geometrical Mean	16.95
Tot.	51. 39
	9
	462.51

Multiplyed by 9, the one third of the Tuns depth gives 462.51 Gallons for the Tuns Content.

The Content may be given very speedily by the sliding Rule, on the Lines A and B.

As 282 is to 84, so is 68 to the Area of the greater Base, *viz.* —— 20. 25

As 282 is to 69. So is 58 to the Area of the Lesser Base, *viz* —— 14. 19

To find a *Geometrical Mean* betwixt these two Area's; On the Lines C and D, Set 14.19 upon C, to 14.19 upon D, And then against 20.25, upon C. is 16.95 upon D. So 16.95 *is a Geometrical Mean betwixt these two Area's.* —— 16. 95 / 51. 39 / 9 / 462.51

There is a Town whose greater and lesser Bases are both Eliptical, Parallel, Proportional, and a like Situate, whose greater and lesser Diameters of each Base, are the same Lengths and Breadths of the last Tun; and the depth likewise the same.

How many Ale Gallons will this Tun contain?

The RULE is,

That is, multiply the Transverse by the Conjugate.

Multiply the length of the greater *Base* by the *Breadth*, and the *Squre-Root* of the *product* is a Mean Diam. Then square the said mean Diameter, and Divide by 359.05, Gives the true *Area* of the Greater *Base*. And in the same manner find the *Area* of the Lesser *Base*.

Then find the *Geometrical mean* betwixt the *Area's* of the two *Bases*, as was done in the last *Tun*; and multiply the *Total* of the two Area's and the *Mean*, by one third part of the *Tuns* depth (as before) and the Content will be 363.37 Ale Gallons.

But the *Operation* will be the very same with the *Sliding Rule*, as the other *Tun* was, only using 359 instead of 282.

EXAMPLE,

EXAMPLE.

	A.	Gallons
As 359 *is to* 84: *So is* 68 *to the Area of the greater Base*, viz.	15.	92
As 359 is to 69; So is 58 to the Area of the Leſſer Baſe, *viz.*	11.	14
Set 15.92 upon C. to 15.92 upon D, and againſt 11.14 upon C, is 13.31, the *Geometrical Mean.*	13.	31
Total.	40.	37
Multiply by 9 the one third part of the Tuns depth gives the Content --		9
	363.	33

There is a *Tun* whoſe *Baſes* are both *ſquare*, but unequal; the ſide of the Greater Baſe is 120 inches, the ſide of the Leſſer Baſe is 104, and the *Depth* 33 inches.

What's the Content in Ale Gallons?

This *Tun* is the *Fruſtum* of a *Pyramid*, and may be Gauged by the *General Rule* given: only mind to Divide by 282.

There is a *Conical Tun*, whose Bases are both *Circular*, and the Diamiters of the greater and lesser *Bases*, and *Depth*, are the same of this last Tun: *What's the content in Ale-Gallons?*

As this is the Frustam *of a Pyramid, 'tis done likewise by the General Rule, only dividing by* 359.05.

A Conical Tun, whose Diamiter at the bottom is	108	Inches
The Diamiter at the Top is	93	
And the Depth is	30	

How many Ale-Gallons will this Tun contain upon every Inch of the Depth?

Rule is,

First Divide the Difference of the Bottom and Top Diamiter, by the Depth, and the Quotient is a common Addend. Then find the Area of the Diamiter in the middle of every 10 *or* 12 *Inches of the Depth.*

```
   108
    93
   ---
30) 15 (.5 addend
    150     5
   ----    ---
    000    2.5
```

.5 .5
10
5.0 5.0

93
2.5
95.5 Mean Diamiter 5 Inches from Top
5
100.5 Mean Diamiter 15 Inches from Top
5
105.5 Mean Diamiter 25 Inches from Top

The Area's of the 3 Diamilers { 25.40 / 28.13 / 31.00 } in A. Gall.

Total 84.53
10
845.30

Multipl. by ten, the one third part of the depth,
Gives 845.30 for the content of the Tun.

Or

Or thus, at every 12 Inches.

6	12	9
.5	.5	.5
3.0	6.0	4.5

93
3
96 Mean Diam. 6 Inches from Top
6
102 Mean Diam. 18 Inches from Top
4.5
106.5 Mean Diam. 27 Inches from Top

	Area's	B.	F.	G parts
The Area's	25.67	0	3	0.17
of these 3	28.97	0	3	3.47
Diamiters	31.59	0	3	6.09

25.67	28.97	31.59
12	12	6
5134	5794	189.54
2567	2897	
308.04	347.64	
347.64		
189.54		

845.22 Gallons

B.	F.	G parts
24	3	3.72
	3	0.17
24	0	3.55
	3	0.17
23	1	3.38
	3	0.17
22	2	3.21
	3	0.17
21	3	3.04
	3	0.17
21	0	2.87
	3	0.17
20	1	2.70
	3	0.17
19	2	2.53
	3	0.17

18	3	2.36
	3	0.17
18	0	2.19
	3	0.17
17	1	2 02
	3	0.17
16	2	1.85
	3	0.17
15	3	1.68
	3	3.47
14	3	6.71
	3	3 47
14	0	3.24
	3	3 47
13	0	8.27
	3	3 47
12	1	4.80
	3	3.47
11	2	1.33
	3	3.47
10	2	6.36
	3	3.47
9	3	2.89
	3	3.47

Note.

8	3	7.92
	3	3.47
8	0	3 45
	3	3.47
7	0	8.48
	3	3.47
6	1	5.01
	3	3.47
5	2	1.54
	3	6.09
4	2	3.95
	3	6.09
3	2	6.36
	3	6.09
2	3	0.27
	3	6.09
1	3	2.68
	3	6.09
0	3	6.09
	3	6.09
0	0	0.00

Note,

This Table of the Conical Tun is made from the precedent work.

Inches	B.	F.	G. parts
0	24	3	3.72
1	24	0	3.55
2	23	1	3.38
3	22	2	3.21
4	21	3	3.04
5	21	0	2.87
6	20	1	2.70
7	19	2	2.53
8	18	3	2.36
9	18	0	2.19
10	17	1	2.02
11	16	2	1.85
12	15	3	1.68
13	14	3	6.71
14	14	0	3.24
15	13	0	8.27
16	12	1	4.80
17	11	2	1.33
18	10	2	6.36
19	9	3	2.89
20	8	3	7.92
21	8	0	3.45
22	7	0	8.48
23	6	1	5.01
24	5	2	1.54
25	4	2	3.95
26	3	2	6.36
27	2	3	0.27
28	1	3	2.68
29	0	3	6.09
30	0	0	0.00

To Inch a Tun, whoſe Baſes, or Top and Bottom Diamiters are unlike, viz. *the Top Eliptical, and the Bottom Circular.*

Admit the Diamiter of the *Circular part* at the Bottom be 110.1 Inches; and the *Axis* (or Longeſt *Diamiter* at the *Top*) of the *Eliptical part* be 110.2, and the Shorteſt Diamiter 101.1, and the Tun's Depth 19.8 Inches.

To Inch this Tun, take with the Long Rule the Croſs-Diamiters, in the middle of every 6 or 4 Inches of the Tun's Depth: Thus at 2 Inches from the Top the Longeſt Diamiter is 110.2 *Inches, and the Shorteſt* 101.1. *In the middle of the next four Inches, which is 6 Inches from the Top, the Longeſt Diamiter is* 110.2, *and the ſhorteſt* 103.1 *Inches; and ſo I find the reſt, as are expreſſed in the following Table.*

Now having theſe Diamiters, the *Area* of the *Mean Inch*, in the middle of every 4 Inches, may be thus found; *Multiply* the *Longer Diamiter* by the *Shorter*, and the Square Root of the Product is a *Mean Diamiter*. Or divide the Product by 359.05 gives the Area in Ale Gallons, without extracting the Square-Root.

```
   110.2
   101.1
   -----
    1102
   1102
  1102
  -----
 . . . . M.Dia.  Area
11141.22(105.55—31.02
1
—
01141
  205
  ----
  1025
  -----
   11622
    2105
   -----
   10525
   -----
    109700
     21105
    ------
    105525
    ------
      4175
```

Or work thus by the Sliding Rule; Set 359.05 *upon B, to the Longest Diamiter,* viz. 110.2 *upon A; Then against the shorter Diam. upon B, is the Area in Ale-Gallons; Thus against* 101.1 *is* 31.02, *the Area of the first four Inches; against* 103.1 *is* 31.64, *the Second Area; and so of the rest, as in the Table.*

Depth

Depth	*Axis*	*ſhorter Diam.*	*Mean Inch in A.G*	*Cont of every 4 Inches of the Tun's depth in* B. F. G. parts
4	110.2	101.1	31.02	3——2——5.68
4	110.2	103.1	31.64	3——2——7.56
4	110.2	105.1	32.25	3——3——1.50
4	110.2	107.1	32.87	3——3——3.98
3.8	110.2	109.1	33.48	3——2——8.22
19.8		Whole cont.		18——3——0.84

To find the Drip and Fall of a Tun, and to make Allowance for the ſame in Inching the Tun.

Admit this Tun were ſo placed, that when the Bottom is juſt covered on one ſide, the Liquor is juſt 3.8 Inches deep on the other ſide oppoſite? How much muſt be allowed for the Fall of the Tun; By the Work aforegoing the Area of the Mean Diamiter in the middle of the 3.8 laſt Inches (that is at 1.9 Inch from the Bottom) was found to be 33.48, this multiplied by 3.8 makes 127.224 Ale-Gallons, the half of which is 63.61, And ſo much may be allowed for the Drip or Fall of the Tun.

Now reduce this 63.61 into Barrels, Firkins and Gallons, and it makes 1 Barrel, 3 Firkins, 4 Gallons, and 11 parts.

This

This taken from 18—3—0.84 the content of the
1—3—4.11 Tun when it
stands level.
Remains ——— 16—3—5.23

And ſo much will the Tun contain when the Fall or Drip is 3.8 Inches.

16—3—5.23
3—5.52
15—3—8.21
3—5.52
15—0—2.69
3—5.52
14—0—5.67
3—5.52
13—1—0.15
Note, 3—6.14
12—1—2.51
3—6.14
11—1—4.87
3—6.14
10—1—7.23
3—6.14
9—2—1.09
Note, 3—6.75

8—2—2.84
3—6.75

7—2—4.59
3—6.75

6—2—6.34
3—6.75

5—2—8.09
3—7.37 *Note,*

4—3—0.72
3—7.37

3—3—1.85
3—7.37

2—3—2.98
3—7.37

1—3—4.11

Here Note, the Remainder at 16 Inches dry, to be 1 Barrel, 3 Firkins, 4 Gallons, and 11 parts, which argues the Work is done exactly.

This Table of the Eliptical Tun is made from the precedent work.

Depth	B.	F.	G.
0	16	3	5.23
1	15	3	8.21
2	15	0	2.69
3	14	0	5.67
4	13	1	0.15
5	12	1	2.51
6	11	1	4.87
7	10	1	7.23
8	9	2	1.09
9	8	2	2.84
10	7	2	4.59
11	6	2	6.34
12	5	2	8.09
13	4	3	0.72
14	3	3	1.85
15	2	3	2.98
16	1	3	4.11

How to Gauge a Copper, and make allowance for the Riſing Crown.

Admit the Diamiter at the Top be 109. 5 Inches, the Diamiter at the Bottom of the Crown 83.3 Inches, and Depth of the whole Copper 40.1 Inches. The Diamiter which touches the Vertix or top of the Crown 89.7 Inches; And the Altitude of the Riſing Crown 7.3 inches.

I demand the whole Content of the Copper from the Top, to the Vertix of the riſing Crown? And the Content of the Liquor that Juſt Covers the Crown?

And laſtly, What it holds upon every 6 inches from the Top to the Vertix of the riſing Crown?

The Rule, is,

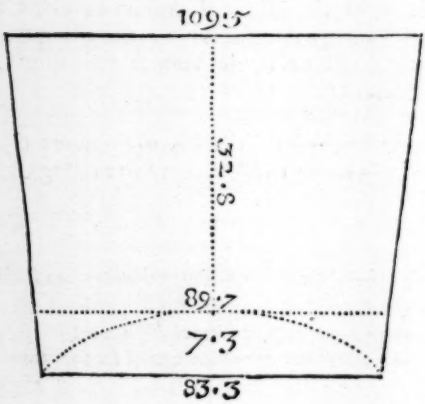
Take the Area of the greater Diamiter, and the Area of the Diamiter that Touches the Top of the Crown, and a Geometrical mean proportional betwixt the two Area's The ſum of theſe three multiplied by one third part of the depth from the Top, to the Vertix of the Crown, Gives the content of that part; Or ſo much will *the Copper contain after the Crown is Juſt covered.*

The Rule to find the Content of the Riſing-Crown, is,

Multiply the Area of the Diamiter of the Bottom of the Crown, by half the Crowns altitude, Gives the content of the Crown.

Then ſubſtract the content of the Crown, from that part of the Diamiter at the Vertix, to the Diamiter at the Bottom; And the Remain is the Quantity of Liquor that will Juſt cover the Crown.

EXAMPLE.



109.5
109.5
5475
9855
1095
——Gall. parts
359)11990.25(33.399
1077
1220
1077
1432
1077
3555
3231
3240
3231
0009

89.7
89.7

6279
8073
7176

Gall.

359)8046.09(22.412
718

866
718

1480
1436

449
359

900
718

182

The Area at the Top —	33.399
The Area at the Vertix —	22.412
The Geometrical Mean —	27.400
The Total —	83.211
Multipl. by ⅓ of the Depth	10.933
Cont. from the Top to the Crown's Vertix	909.745863

83.3
83.3

2499
2499
6664

359)6938.89(19.328 *Area at the bottom of the Crown.*
359

3348
3231
1178
1077

1019
718

3010
2872

138

To

19.328 *multiplied by* ½ *the Crown's Altitude.*
3.65

96640
115968
57984

70.54720 *the content of the Crown*

Now the Area of the Vertix is 22.412
And the Area at the Bottom is—19.328

Total 41.740 Gallons

The half of these two Area's is——20.87
Multiplied by the Crown's Altitude—7.3

6261
14609

152.351

Which makes 152.351 Gallons; from which substract 70.5472, the Crown's content; and the Remain will be the Liquor which will just cover the Crown.

EXAMPLE.

152.351
70.5472

Gallons 81.8038

Now

Now to 909.745863
add —— - 81.8038

991.549663

Which ſhews, that 991 *Gallons and a half is the Copper's content.*

To know what the *Copper holds upon every* 6 *inches from the Top* to *the Vertix of the Crown.*

The Rule is,

Divide the Difference of the Top, and Vertix Diamiters, by the depth from the Top to the Vertix, and the Quotient is a common Subducend.

Then find the Areas of the Diamiters in the middle of every ſix Inches of the depth; and laſtly, Multiply each Area by its particular depth; gives the true Content upon every ſix Inches, and the odd parts.

Why is 282. *The Diviſor for a ſquare?* Becauſe 282 Cubical Inches are an Exchequer-Gallon of Ale.

Why is 16.79 *the Gauge point for a ſquare?* Becauſe it is the ſquare Root of 282, or ſo many Inches in Diamiter, is Juſt one Gallon upon a ſquare, in one inch deep in Liquor.

Why is 231 *Diviſor for wine upon a ſquare?* Becauſe 231 Cubical Inches are an Exchequer-Gallon of *Wine.*

Why

Why is 15.199 *the Gauge-point for Wine upon a ſquare?* becauſe it is the ſquar-Root of 231, or ſo much in Diamiter of a ſquare, is Juſt a Wine-gallon upon one Inch deep in Liquor.

Why is 18. 9487 *the Gauge-point for Ale upon a Circle?* Becauſe a Circle of that Diamiter is Juſt one Gallon upon one Inch deep in Liquor; (*and that it is the ſquare-root of* 359. 05.)

Why is 17.1498 *the gaug point for wine upon a Circle?* becauſe a Circle of that Diamiter one inch deep in Liquor is Juſt a wine gallon: (*and it is the ſquare-root of* 294.1) the Diviſor for a Circle.

Why is 359.05 *the Diviſor in Ale-gallons for a Circle?* Becauſe it is the ſquare of 18. 9487, *the Gauge-point for a Circle.*

Why is 294. 1 *the Diviſor in Wine* Gallons for *a Circle?* Becauſe it is the ſquare of 17. 149, the Gauge-point for a Circle.

A Spheroidical Cask whoſe Bung Diamiter is 27. 5. *and Head* 23.8. *And the Length* 32, What's the Content in Ale-Gallons.

The Rule is,

To the double ſquare of the Bung Diamiter, add the ſquare of the Head Diamiter, and the Total Divide by 1077. Then multiply that Quotient by 32 (the Length) gives the Content of the Cask in Ale-gallons.

But

But why is 1077 *the Diviſor?* Becauſe it is the trible of 359, (*the Diviſor for a circle in Ale gallons*)

What is the Content of the ſaid Cask in Wine Gallons?

The work is the ſame, only inſtead of 1077, Divide by 882.3, becauſe it is the trible of 294.1, (*the Diviſor for a Circle in wine Gallons*.)

How to find a *Gauge-point* for any *Meaſure*, either *Liquid* or *Corne Meaſure*: Firſt note that 272.25 Cubical Inches is a Corne Gallon, or a Gallon of Malt; But the goods or grains of indifferent Malt, and of indifferent Grinding, when three worts have paſſed through it, it is more Compact by about a Sixth part: So in the South and Weſt parts of England 227 may be ſaid to be a Gallon, or a Diviſor proper for a ſquare Maſh Tun, and 288 for a round maſh Tun: But in *Yorkſhire* and the *Northern-Counties* indifferent malt and of indifferent Grinding, is Compact but about an 8th part; So 238 may be ſaid to be a Gallon there, or the Diviſor proper for a ſquare Maſh Tun; and 303 for a Round maſh Tun.

Yet the Diviſors are to be Altered by the Superviſor, according to the Country malt made uſe of: For his *Experience* in this Caſe, will be the beſt *Director*.

So the Square Root of 227. is the Gauge point for ſquare Maſh Tuns of the ſouth and weſt Country Malt. And the ſquare root of 288 is the Gauge point for Round maſh Tun's.

Likewiſe 238, the ſquare root of which, is the Gauge point for ſquare Maſh Tun's in *Yorkſhire* and the *Northern Counties*. And the ſquare-root of 303 is the Gauge point for Round Maſh Tuns.

The ſquare Root of the Cubical Inches of either Ale, Wine, or Corn Gallon, is the Gauge point for gallons. And likewiſe the ſquare Root of the Cubical Inches in a Buſhel, or Quarter, is the Gaug point for *Buſhels* and *Quarters*.

Note that 8 Corne gallons is a *Buſhel*, and 8 Buſhels is a *Quarter*.

How to turn Gallons of Ale into Gallons of Wine.

EXAMPLE.

In 27 Gallons of Ale, How many gallons of Wine?

By the Rule of THREE.

9. 11 :: 27. 33
27
297 (33 *Wine Gallons.*
27
27
27
00

Note that the Proportion between 9 and 11 is found by Multiplying 282 by 9, and dividing the Product by 231.

In

In 33 Gallons of Wine, How many Ale-Gallons?

11. 9 :: 33. 27
9
11) 297 (27
22
77
77
00

The *Area* of a CIRCLE being 4.2 Ale Gallons what's the Diamiter of the ſaid *circle*?

Multiply the Area by 359.05, and the ſquare Root of the Product gives the Diamiter of the CIRCLE.

Of Cask Gauging.

MOſt *Writers*, and *Artiſt's* Treating on this ſubject, do give their *Opinion* that every common Cask (*as Butts, Pipes, Hogsheads, Barrels, and ſuch Like*) are in the Form of theſe four *Solids*. viz.

Either of the middle Fruſtum of a Spheroid. Or the middle Fruſtum of a parabolical Spindle.

Or the midle Fruſtum of two parabolical Conoids a-butting upon one common Baſe. Or the middle Fruſtum of two Cones a-butting upon one common Baſe.

Which by theſe 4 Rules following, the content of any cask may be found very near the Truth.

EXAMPLE. I.

A Cask that's in the Form of the middle Fruſtum of a Spheroid,

Whoſe Bung Diamiter is —— 32
Head Diamiter is —— —— 25 } Inches.
And the Length —— —— 45

What's the Content in Ale or Wine Gallons?

The *Rule* is,

To the Sum, and half Sum of the Squares of the Bung and Head Diamiters, add half the difference of the ſaid Squares; the Sum Multiply by the Length, and divide the Product by

1077 } *the Quotient is* } *Ale* } *Gallons.*
882 } } *Wine* }

The

The Square of 32 is——1024
The Square of 25 is——625

The Sum is——1649
The half Sum is——824.5
Half the differ. of the Square 199.5

The Sum is——2673
Multiplied by the length 45

Divided by——1077)120285(111.67 *the con. in A.G*

EXAMPLE II.

Admit a Cask of the same Diamiters and Length, in the form of the middle Frustum, of a Parabolical Spindle; (*a Cask whose Staves betwixt the Bung and Head are less curved, by about one third part, than the Spheroid,*)

How many Gallons will this Cask contain?

The RULE is,

"*To the Sum and half Sum of the Squares of the B and H Diamiters, add 3 tenth parts of the difference of the said Squares, the Sum multiply by the Length, and divide as before, gives the content in Ale or Wine Gallons respectively.*

The

The Sum of the Squares is—1649
The half Sum is———8245
The 3 tenth parts of the difference of the Squares is———119·7

The Sum of these is———2593·2
Multiplied by the Length——45

And divided by—1077)116694·0(108 34 *con. in A.G*

EXAMPLE III.

Admit a Cask of the same Diamiters, and Length, as before, in the form of the middle Frustum, of two Parabolical Conoids; *(a Cask whose Staves betwixt the B and H, have little Curveture, lying nearer to the streight Line than to the curved.)*

What's the Content of such a Cask?

The Rule is,

To the Sum, and half Sum of the Squares of the B and H Diamiters, add one tenth part of the Difference of the said Squares, the Sum multiply by the Length, and the Product divide, as in the first Example, gives the content in Ale or Wine Gallons respectively.

The

The Sum of the Squares is — 1649
The half Sum is — — — 824.5
One tenth part of the difference of the Squares is — 39.9

The Sum of these is — 2513.4
Multiplied by the Length — 45

Product divid. by 1077)113103.0(105.01 *cont. A.G*

EXAMPLE IV.

Suppose a Cask of the same Diamiters, and Length, should be in the Form of the middle Frustum, of two Cones Abutting upon one common Base.

What will be the Content of such a Cask in Ale or Wine Gallons?

The Rule is,

From the Sum and half Sum of the Squares of the B and H Diamiters, substract half the Square of the difference of the Diamiters themselves, and multiply the Remainder by the Length, and divide the Product, as in the first Example, gives the content in Ale or Wine Gallons respectively.

The

The Sum of the Squares is—1649
The half Sum is———824.5

The Sum of these is——2473.5
The half the Square of the difference of the Diamiters substracted———24.5

The Remain is———2449.0
Multiplied by the Length——45

Product divided by 1077)110205(102.42

Now 'tis plain, by these Four Rules, that if the Dimensions of a Cask

Be { Bung Diamiter 32 / Head Diamiter 25 / and the Length 45 } Inches

That the Contents of these 4 sorts of *Casks* are as followeth:

	Gallons	*Diff.*
I. *As a Spheroid*———	111.67	3.33
II. *As a Parabolical Spindle*———	108.34	3.33
III *As the middle Frustum of two Conoids*	105.01	2.59
IV. *As the middle Frustum of two Cones*——	102.42	

Observe here, That the Difference between the Content of the first, and second, is equal to the *difference*, between the second and third; and the *difference* between the third and fourth are scarce 3 *Quarts* less than the other; which indeed it ought to be somewhat less, because the *Staves* betwixt the *Bung*

Bung and *Head* are little *curved*, and lie near to the ſtreight *Line*. Which *plainly demonſtrates* theſe *four Rules* to be very near the *Truth*.

Yet it may be ſuppoſed, that a *Cask* of theſe Diamiters, and Length, may contain ſome certain quantity betwixt the Contents here found: But in ſuch Caſes proceed by the Rule given, adding 1, 2, 3, 4, or 5 tenth parts of the difference of the Squares, as Judgment, and the Shape of the *Cask* ſhall direct.

And the like Caution muſt be obſerved in the finding the Mean Diamiter (*or Reducing the Cask into a Cylinder*) if you work by the Sliding Rule.

For a Cask { Much Bulging / as a Spheroid / Parabolick / Conical } *The Multiplier is* { .75 / .7 / .6 / .5 }

So between .8 tenths and .5 tenths will all Casks happen, that are hooped.

Of a Standing Cask part empty.

A Cask ſuppoſed to be the middle Fruſtum of a Speroid, ſtanding upon one Head, with its Axis perpendicular to the Horizon,

Whoſe { *Bung diam. is* 26.8 / *Head diam. is* 23.3 / *Length is* —— 30.6 } *Inches.*

And 7.5 Inches being dry, or wanting so much of being full,

What's the Quantity of the Liquor in the Cask?

Divide the difference of the Area's of the Bung and Head Diamtters, by trible, the Square of half the Cask's Length; then multiply the Quotient by the Square of the Inches from the plain of the Bung to the Liquor's Surface; and the Product subducted from the Area of the Bung Diamiter, will leave the Area of a Mean Circle, which multiplied by the distance from the plain of the Bung to the Surface of the Liquor, gives the content betwixt the Bung and Surface.

Which subducted from half the content, the Remain will be the Gallons required to fill the Cask.

Half the Cask's Length 15.3
15.3 *squar'd*

459
765
153

234.09
3 *tribled*

702.27

The

Gallons

The Area of B. Diam. is 2.0003
The Area of H. Diam. - 1.512

Divided by — 702.27).488300000(.0006953
421362 ... 60.84

669380 27812
632043 61624
41718

373370
351135 .042362052

222350
210681

11669

Bung Area — 2.0003
.042362052
The Area of a M. Circle — 1.957937948

Multiplied by the Inches from the Bung to the Liquor's Surface — 7.8

15663503584
13705565636

15.2719159944

Here it is 15 Gallons, and 27 parts, as by the other Rule

If the Diamiter of the Surface of the Liquor be known, Then to the double Area of the Bung Diam. add the A-

rea of the Diamiter of the Liquor's Surface; and a third part of the Sum is the Area of a Mean Circle.

How to find the *Ullage*, or vacant Fruſtum of a *Cylindrical Cask*, partly full, lying with its *Axis* parallel to the *Horizon*.

EXAMPLE.

A Cask whoſe content is 80 *Gallons*
The Bung Diamiter——29 *Inches*
The Dry Inches——13
The Wet Inches——16

The Rule is,

Divide the Wet or Dry Inches by the Bung Diamiter, adding two (or more) Cyphers; and the Quotient ſeek under the Title V.S. gives a Segment, which multiplied by the whole content of the Cask, gives the Quantity of the Liquor in the Cask, or the Gallons wanting.

29)13·00(.44
1
116
45
140
116
24

.4364
80

34.9120

Here 13 divided by 29, the Quot. is but 44, and 24 is *the Remain*: So always obſerve that when the *Remain* is above half the *Diviſor*, add one to the *Quot.* Now againſt 45 in the Table of *Segments*, under V.S. gives .4364, which multiplied by 80 *(the whole content of the Cask)* the Product is 34 Gallons, and Nine tenth parts of a Gallon; and ſo much the CASK wants of being full.

29)16.00(.55
145
150
145
5

Here the Quot. is 55 *againſt which in the Table of Segments is* .5636

Which multiplied by 80 the content, gives the Liquor in the Cask — 80

45.0880 Liquor in the Cask
34.912 Liquor wanting
80.0000

A

A Table *of the* Segments *of a Circle.*

V.	*Area.*	*V.*	*Area.*	*V.*	*Area.*	*V.*	*Area.*
1	.0017	99	.9983	26	.2066	74	.7934
2	.0048	98	.9952	27	.2178	73	.7822
3	.0087	97	.9913	28	.2292	72	.7708
4	.0134	96	.9866	29	.2407	71	.7593
5	.0187	95	.9813	30	.2523	70	.7477
6	.0245	94	.9755	31	.2640	69	.7360
7	.0308	93	.9692	32	.2759	68	.7241
8	.0375	92	.9625	33	.2878	67	.7122
9	.0446	91	.9554	34	.2998	66	.7002
10	.0520	90	.9480	35	.3119	65	.6881
11	.0598	89	9402	36	.3241	64	.6759
12	.0680	88	.9320	37	.3364	63	.6636
13	.0764	87	.9236	38	.3487	62	.6513
14	.0151	86	9149	39	.3611	61	.6389
15	0941	85	9059	40	.3731	60	.6265
16	.1033	84	.8967	41	.3860	59	.6140
17	.1127	83	.8873	42	.3986	58	.6014
18	.1224	82	.8776	43	.4112	57	.5888
19	.1323	81	.8677	44	.4238	56	.5762
20	.1424	80	.8576	45	.4364	55	.5636
21	.1527	79	.8473	46	.4491	54	.5509
22	.1631	78	.8369	47	4618	53	.5382
23	.1737	77	.8263	48	.4745	52	.5255
24	.1845	76	.8155	49	.4873	51	.5127
25	.1955	75	.8045	50	.5000	50	.5000

Note, that the Tables of Segments are made only for a Cylinder. *But the Line of Segments on the Sliding-Rule is made for a Spheroid, and therefore is more exact for all Bulging Casks; and the Tables of Segments only proper for a* Cylindrical Gask.

A *ſpeedy way* (*by the Pen*) how to find the *Uliage*, or *Vacant Fruſtum* of either a *Spheroidical* or *Cylindrical* Cask, with its *Axis* lying parallel to the *Horizon*, without either *Rule* or *Table* of *Segments*.

The Rule is,

For a *Cylindrical Cask*, divide the Wet or Dry Inches by the Bung Diamiter, as before. If the Quot. be under Fifty, ſubſtract from the Quot. a Fourth Part of that Number, which would make it Fifty: and the Remain multiply by the content. *But* if the Quot. be above Fifty, then add a *4th* part of that Number, which is above 50, to the *Quot.* and the Total multiply by the *content.*

Note. that if the Quot. proves under 20, *or above* 80, *inſtead of one fourth part, add or ſubſtract one fifth part.*

For EXAMPLE.

The ſame Cask as was laſt, content 80 *Gallons*

Bung 29
Dry 13 } *Inches.*
Wet 16

```
29)13.00  (.44
     . .     1
   116     ---
  -----    .45
    140    125
    116    ----
     24    .4375
                80
          -------
          35.0000
             .05
          -------
          34.9500
```

The Quot. wants 5 of Fifty: so substract 125, the Fourth part of Five from 45, and the Remain is .4373, which multiplied by the content, gives 35 Gallons for the dry Inches; which is too much by 5 parts of an hundred parts of a Gallon; *Because (in dividing)* 24 *went for* 29. Therefore substract the said 500 parts from 35 Gallons, and the Remain will be 34.95 Gallons, the true *content* of the dry Inches.

29) 16.00 (.55
145 125
.5625
150 80
145
45.0000
5 .05
45.0500

Here the Quot. is 5 above Fifty, therefore I add a Fourth part of five to 55, the Quot. and multiplies the Sum by the content, gives 45 Gallons of the Wet Inches, which is too little by 5 of an hundred parts, becauſe five remain'd in the Diviſion, therefore I add the ſaid 5 parts of an hundred to 45, which make 45.05 Gallons, the *true content* of the wet Inches.

	Gall.
So the content of the Dry Inches is	34.95
And the content of the Wet is	45.05
	80.00

Which is the ſame as with the Table of Segments.

Now as a *Spheroid*, or *Bulging Cask*, ſubſtract, or add one third part, inſtead of one fourth part, and multiply as before, by the content, &c.

EXAMPLE.

A Spheroidical Cask whose content is 64 Gallons.

The Bung Diamiter is	27	Inches.
Dry Inches is	11	
The Wet is	16	

```
27)11.00(.40
      ..  1
   108 ---
 ------ :41
    20    3
         :38
          64
       -----
         152
        228
       -----
        24.32
          .7
       -----
        23.62
```

Here the Quot. wants 9 of Fifty; so the third part of 9 is 3, which substracted from 41, and remains 38, which multiplied by 64 *(the content)* gives 24.32 for the *Gallons wanting*: yet it is .7 tenths of a Gallon too much, because (in dividing) 20 went for 27; so .7 tenths must be substracted

ſtracted out of 24.32, and the remain 23.62, the *exact Quantity of the Dry Inches.*

```
27) 16.00 (.59
        ..   3
    135    ---
  -------   .62
     250    64
     243    ---
       7   248
          372
        -------
         39.68
           .7
        -------
         40.38
```

Here the Quot. is 9 above 50, ſo add one third of Nine to 59, the Quot. and multiply the Sum by 64 *(the content.)* gives 39.68 Gallons for the *content of the wet Inches*, which is too little by .7 *tenths* of a Gallon: Becauſe Seven remain'd in the *Diviſion*: therefore add .7 *tenths* to 39.68, and it makes 40.38 parts, the *true content* of the wet Inches.

The Three Useful Problems by M. D.

BY the Head Diamiter, Length and Content, to find the Bung Diamiter, as a *Spheroid*?

Multiply the content by 1077.16, *and divide the Product by double the Length, and from the Quot. substract half the Square of the Head Diamiter; and the Square-Root of the Remain is the Bung Diamiter.*

Note, that 1077.16 *is thrice the Square of the Gauge-Point.*

By the Length, Content, and Bung Diamiter, to find the Head Diamiter?

Multiply the content by 1077.16, *and divide the Product by the Length, and from the Quot substract twice the Square of the Bung Diamiter, and the Square-Root of the Remain is the Head Diamiter.*

By the Bung and Head Diamiters, and Content, to find the Length of the Cask?

Mul-

Multiply the content by 1077.16, *and divide the Product by twice the Square of the Bung, and once the Square of the Head Diamiters, in one Sum, the Quot. will be the Length of the Cask.*

The

The Use of the following Table of CYLINDERS.

IN the Top of the Table are plac'd the Diamiters in Inches and Tenths, from 8 Inches to 60 in Diamiter, beginning in the 8*th* page of the Table, .1 .2 .3 .4 .5 .6 .7 .8 .9: Which is 8 Inches and two Tenths, 8 Inches and three Tenths, *&c.*

On the Top of each Page, in the first Column on the Left Hand is the Depth of the *Cylinder*, beginning .1 .2 .3, *&c.* to 31 Inches in Depth.

The Number in the other Columns is the content in Ale-Gallons, and hundred parts, answering to the Diamiter at the Top of the Table, and the Depth of the first Column in the side of the Table.

EX-

EXAMPLE.

Suppoſe the Diamiter be 26.5 *Tenths of an Inch, the Depth* 14.7 *Tenths of an Inch?*

In the Top of the Table find 26.5, *underneath which, againſt* 14 *in Inches is* ——— 27.38
And againſt .7 *Tenths of an Inch is* ——— 1.37

28.75

Which being added together makes 28.75, *that is,* 28 *Gallons, and* 75 *parts of a Gallon, or Three Quarts.*

A

TABLE

OF

Cylinders,

From 8 to 60 Inches in *Dia*-miter, and 31 inches in *D*epth, Calculated to every tenth of an inch in Diamiter, and to every tenth of an inch in Depth; Very ready and of excellent uſe for all Officers to caſt up their Gauges.

By *GEORGE WARD*, Gauger.

A

TABLE

OF

Cylinders.

	8	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
.2	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04
.3	0.05	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07
.4	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08	0.09	0.09
.5	0.09	0.09	0.09	0.10	0.10	0.10	0.11	0.11	0.11	0.11
.6	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.13	0.13	0.13
.7	0.12	0.13	0.13	0.13	0.14	0.14	0.14	0.15	0.15	0.15
.8	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.17	0.17	0.18
.9	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.19	0.20
Area	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.22	0.22
2	0.36	0.37	0.37	0.38	0.39	0.40	0.41	0.42	0.43	0.44
3	0.53	0.55	0.56	0.58	0.59	0.60	0.62	0.63	0.65	0.66
4	0.71	0.73	0.75	0.77	0.79	0.80	0.82	0.84	0.86	0.88
5	0.89	0.91	0.94	0.96	0.98	1.01	1.03	1.05	1.08	1.10
6	1.07	1.10	1.12	1.15	1.18	1.21	1.24	1.26	1.29	1.32
7	1.25	1.28	1.31	1.34	1.38	1.41	1.44	1.48	1.51	1.54
8	1.43	1.46	1.50	1.53	1.57	1.61	1.65	1.69	1.73	1.76
9	1.60	1.64	1.69	1.73	1.77	1.81	1.85	1.90	1.94	1.99
10	1.78	1.83	1.87	1 92	1.96	2.01	2.06	2.11	2.16	2.21
11	2.96	2.01	2.06	2.11	2.16	2.21	2.27	2.31	2.37	2.43
12	2.14	2.19	2.23	2.30	2.36	2.41	2.47	2.53	2.59	2.65
13	2.32	2.37	2.43	2.49	2.55	2.62	2.68	2.74	2.80	2.87
14	2.49	2.56	2.62	2.69	2.75	2.82	2.88	2.95	3.02	3.09
15	2.67	2.74	2.81	2.88	2.95	3.02	3.09	3.16	3.24	3.31
16	2.85	2.92	3.00	3.07	3.14	3.22	3.30	3.37	3.45	3.53
17	3.03	3.11	3.18	3.26	3.34	3.42	3.50	3.58	3.67	3.75
18	3.21	3.29	3.37	3.45	3.54	3.62	3.71	3.79	3.88	3.97
19	3.39	3.47	3.56	3.65	3.73	3.82	3.91	4.00	4.10	4.19
20	3.56	3.65	3.75	3.84	3.93	4.02	4.12	4.22	4.31	4.41
21	3.74	3.84	3.93	4 03	4.13	4.22	4.33	4.43	4.53	4.63
22	3.92	4.02	4.12	4.22	4.32	4.43	4 53	4.64	4.75	4.85
23	4.10	4.20	4.31	4.41	4.52	4.63	4.74	4.85	4.96	5.07
24	4.28	4.38	4.49	4.61	4.72	4.83	4.94	5.06	5.18	5.29
25	4.45	4.57	4.68	4.80	4.91	5.03	5.15	5.27	5.39	5.51
26	4.63	4.75	4.87	4.99	5.11	5.23	5.36	5.48	5.61	5.74
27	4.81	4.93	5.06	5.18	5.31	5.43	5.56	5.69	5.82	5.96
28	4.99	5.12	5.24	5 37	5.50	5.63	5.77	5.90	6.04	6.18
29	5.17	5.30	5.43	5.56	5.70	5.83	5.97	6.11	6.26	6.40
30	5.35	5.48	5.62	5.76	5.89	6.04	6.18	6.32	6.47	6.62
31	5.52	5.66	5 81	5.95	6.09	6.24	6.39	6.53	6.69	6.84

Cylinders in Ale-Gallons.

	.9	.1	.2	.3	4.	5.	6.	7.	.8	.9
.1	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.03	0.03
.2	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
.3	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08
.4	0.09	0.09	0.09	0.10	0.10	0.10	0.10	0.10	0.11	0.11
.5	0.11	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.14
.6	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.16
.7	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.18	0.19	0.19
.8	0.18	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.21	0.22
.9	0.20	0.21	0.21	0.22	0.22	0.23	0.23	0.24	0.24	0.25
Area	0.23	0.23	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27
2	0.45	0.46	0.47	0.48	0.49	0.50	0.51	0.52	0.53	0.55
3	0.68	0.69	0.71	0.72	0.74	0.75	0.77	0.79	0.80	0.82
4	0.90	0.92	0.94	0.96	0.98	1.01	1.03	1.05	1.07	1.09
5	1.13	1.15	1.18	1.20	1.23	1.26	1.28	1.31	1.34	1.36
6	1.35	1.38	1.41	1.45	1.48	1.51	1.54	1.57	1.60	1.64
7	1.58	1.61	1.65	1.69	1.72	1.76	1.80	1.83	1.87	19.1
8	1.80	1.84	1.89	1.93	1.97	2.01	2.05	2.10	2.14	2.18
9	2.03	2.08	2.12	2.17	2.21	2.26	2.31	2.36	2.41	2.46
10	2.26	2.31	2.36	2.41	2.46	2.51	2.57	2.62	2.67	2.73
11	2.48	2.54	2.59	2.65	2.71	2.77	2.82	2.88	2.94	3.00
12	2.71	2.77	2.83	2.89	2.95	3.02	3.08	3.14	3.21	3.28
13	2.93	3.00	3.06	3.13	3.20	3.27	3.34	3.41	3.48	3.55
14	3.16	3.23	3.30	3.37	3.45	3.52	3.59	3.67	3.74	3.82
15	3.38	3.46	3.54	3.61	3.69	3.77	3.85	3.93	4.01	4.09
16	3.61	3.69	3.77	3.85	3.94	4.02	4.11	4.19	4.28	4.37
17	3.83	3.92	4.01	4.10	4.18	4.27	4.36	4.46	4.55	4.64
18	4.06	4.15	4.24	4.34	4.43	4.52	4.62	4.72	4.81	4.91
19	4.29	4.38	4.48	4.58	4.68	4.78	4.88	4.98	5.08	5.19
20	4.51	4.61	4.71	4.82	4.92	5.03	5.13	5.24	5.35	5.46
21	4.74	4.84	4.95	5.06	5.17	5.28	5.39	5.50	5.62	5.73
22	4.96	5.07	5.19	5.30	5.41	5.53	5.65	5.77	5.88	6.01
23	5.19	5.30	5.42	5.54	5.66	5.78	5.90	6.03	6.15	6.28
24	5.41	5.53	5.66	5.78	5.91	6.03	6.16	6.29	6.42	6.55
25	5.64	5.75	5.89	6.02	6.15	6.28	6.42	6.55	6.69	6.82
26	5.87	6.00	6.13	6.26	6.40	6.54	6.67	6.81	6.95	7.10
27	6.09	6.23	6.36	6.50	6.64	6.79	6.93	7.08	7.22	7.37
28	6.32	6.45	6.60	6.74	6.89	7.04	7.19	7.34	7.49	7.64
29	6.54	6.69	6.84	6.99	7.14	7.29	7.44	7.60	7.76	7.92
30	6.77	6.92	7.07	7.23	7.38	7.54	7.70	7.86	8.02	8.15
31	6.99	7.15	7.31	7.47	7.63	7.79	7.96	8.12	8.29	8.46

Cylinders in Ale-Gallons.

	10	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
.2	0.05	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.07
.3	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10
.4	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.13	0.13	0.13
.5	0.14	0.14	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.17
.6	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19	0.20
.7	0.19	0.20	0.20	0.21	0.21	0.21	0.22	0.22	0.23	0.23
.8	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.25	0.26	0.26
.9	0.25	0.26	0.26	0.27	0.27	0.28	0.28	0.29	0.29	0.30
Area	0.28	0.28	0.29	0.30	0.30	0.31	0.31	0.32	0.32	0.33
2	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.64	0.65	0.66
3	0.84	0.85	0.87	0.89	0.90	0.92	0.94	0.96	0.97	0.99
4	1.11	1.14	1.16	1.18	1.20	1.23	1.25	1.28	1.30	1.32
5	1.39	1.42	1.45	1.48	1.51	1.54	1.56	1.59	1.62	1.65
6	1.67	1.70	1.74	1.77	1.81	1.84	1.88	1.91	1.95	1.99
7	1.95	1.99	2.03	2.07	2.11	2.15	2.19	2.23	2.27	2.32
8	2.23	2.27	2.32	2.36	2.41	2.46	2.50	2.55	2.60	2.65
9	2.51	2.56	2.61	2.66	2.71	2.76	2.82	2.87	2.92	2.98
10	2.78	2.84	2.90	2.95	3.01	3.07	3.13	3.19	3.25	3.31
11	3.06	3.12	3.19	3.25	3.31	3.38	3.44	3.51	3.57	3.64
12	3.34	3.41	3.48	3.55	3.61	3.68	3.75	3.88	3.90	3.97
13	3.62	3.69	3.77	3.84	3.92	3.99	4.07	4.15	4.22	4.30
14	3.90	3.98	4.06	4.14	4.22	4.30	4.38	4.46	4.55	4.63
15	4.18	4.26	4.35	4.43	4.52	4.61	4.69	4.78	4.87	4.96
16	4.46	4.55	4.64	4.73	4.82	4.91	5.01	5.10	5.20	5.29
17	4.73	4.83	4.93	5.02	5.12	5.22	5.32	5.42	5.52	5.62
18	5.01	5.11	5.22	5.32	5.42	5.53	5.63	5.74	5.85	5.96
19	5.29	5.40	5.51	5.61	5.72	5.83	5.94	6.06	6.17	6.29
20	5.57	5.68	5.80	5.91	6.02	6.14	6.26	6.38	6.50	6.62
21	5.85	5.97	6.09	6.21	6.32	6.45	6.57	6.70	6.82	6.95
22	6.13	6.25	6.38	6.50	6.63	6.76	6.88	7.02	7.15	7.28
23	6.41	6.53	6.67	6.80	6.93	7.06	7.20	7.34	7.47	7.61
24	6.68	6.82	6.95	7.09	7.23	7.37	7.51	7.65	7.80	7.94
25	6.96	7.10	7.24	7.39	7.53	7.68	7.82	7.97	8.12	8.27
26	7.24	7.39	7.53	7.68	7.83	7.98	8.14	8.29	8.45	8.60
27	7.52	7.67	7.82	7.98	8.13	8.29	8.45	8.61	8.77	8.93
28	7.80	7.95	8.11	8.27	8.43	8.60	8.76	8.93	9.10	9.26
29	8.09	8.24	8.40	8.57	8.73	8.91	9.07	9.25	9.42	9.60
30	8.35	8.52	8.69	8.86	9.04	9.21	9.39	9.57	97.5	9.93
2	8.62	8.81	8.98	9.16	9.34	9.52	9.70	9.89	10.07	10.26

	11	.1	.2	.3	.4	5.	.6	7.	8.	9.
.1	0.03	0,03	0.03	0.04	0.04	0.04	0.04	0.04	0.04	0.04
.2	0.07	0.07	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08
.3	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11	0.12	0.12
.4	0.13	0.14	0.14	0.14	0.14	0.15	0.15	0.15	0.15	0.16
.5	0.17	0.17	0.17	0.18	0.18	0.18	0.19	0.19	0.19	0.20
.6	0.20	0.21	0.21	0.21	0.22	0.22	0.22	0.23	0.23	0.24
.7	0.24	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.28
.8	0.27	0.27	0.28	0.28	0.29	0.29	0.30	0.30	0.31	0.32
.9	0.30	0.31	0.31	0.32	0.33	0.33	0.34	0.34	0.35	0.35
Area	0.34	0.34	0.35	0.36	0.36	0.37	0.37	0.38	0.39	0.39
2	0.67	0.69	0.70	0.71	0.72	0.74	0.75	0.76	0.78	0.78
3	1.01	1.03	1.05	1.07	1.09	1.10	1.12	1.14	1.16	1.18
4	1.35	1.37	1.40	1.42	1.45	1.47	1.50	1.52	1.55	1.58
5	1.68	1.72	1.75	1.78	1.81	1.84	1.87	1.91	1.94	1.97
6	2.02	2.06	2.10	2.13	2.17	2.21	2.25	2.29	2.33	2.37
7	2.36	2.40	2.45	2.49	2.53	2.58	2.62	2.67	2.71	2.76
8	2.70	2.75	2.79	2.84	2.90	2.95	3.00	3.05	3,10	3.15
9	3.03	3.09	3.14	3.20	3.26	3.31	3.37	3.43	3.49	3.55
10	3.37	3.43	3.49	3.56	3.62	3.68	3.75	3.81	3.88	3.94
11	3.71	3.77	3.84	3.91	3.98	4.05	4.12	4.19	4.27	4.34
12	4.04	4.12	4.19	4.27	4.34	4.42	4.50	4.58	4.65	4.73
13	4.38	4.46	4.54	4.62	4.71	4.79	4.87	4.96	5.04	5.13
14	4.72	4.80	4.89	4.98	5.07	5.16	5.25	5.34	5.43	5.52
15	5.05	5.15	5.24	5.33	5.43	5.52	5.62	5.72	5.82	5.92
16	5.39	5.49	5.59	5.69	5.79	5.89	6.00	6.10	6.20	6.31
17	5.73	5.83	5.94	6.04	6.15	6.26	6.37	6.48	6.59	6.70
18	6.07	6.18	6.29	6.40	6.52	6.63	6.75	6.86	6.98	7.09
19	6.40	6.52	6.64	6.76	6.88	7.00	7.12	7.24	7.37	7.49
20	6.74	6.86	6.99	7.11	7.24	7.37	7.50	7.63	7.76	7.89
21	7.08	7.21	7.34	7.17	7.60	7.73	7.87	8.01	8.14	8.28
22	7.41	7.55	7.69	7.82	7.96	8.10	8.25	8.39	8.53	8.68
23	7.75	7.89	8.04	8.18	8.33	8.47	8.62	8.77	8.92	9.07
24	8.09	8.24	8.39	8.53	8.69	8.84	8.99	9.15	9.31	9.47
25	8.42	8.58	8.73	8.89	9.05	9.21	9.37	9.53	9.69	9.86
26	8.76	8.92	9.08	9.25	9.41	9.58	9.74	9.91	10.08	10.25
27	9.10	9.27	5.43	9.60	9.77	9.94	10.12	10.29	10.47	10.65
28	9.44	9.61	9.78	9.96	10.14	10.31	10.49	10.68	10.86	11.04
29	9.77	9.95	10.13	10.31	10.50	10.68	10.87	11.06	11.25	11.44
30	10.11	10.30	10.48	10.67	10.86	11.05	11.24	11.44	11.63	11.83
31	10.45	10.64	10.83	11.02	11.22	11.42	11.62	11.82	12.02	12.23

Cylinders in Ale-Gallons.

	12	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.05	0.05
.2	0.08	0.08	0.08	0.08	0.09	0.09	0.09	0.09	0.09	0.09
.3	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.14	0.14
.4	0.16	0.16	0.17	0.17	0.17	0.17	0.18	0.18	0.18	0.19
.5	0.20	0.20	0.21	0.21	0.21	0.22	0.22	0.22	0.23	0.23
.9	0.24	0.24	0.25	0.25	0.26	0.26	0.27	0.27	0.27	0.28
.7	0.28	0.29	0.29	0.29	0.30	0.30	0.31	0.31	0.32	0.32
.8	0.32	0.33	0.33	0.34	0.34	0.35	0.35	0.36	0.36	0.73
.9	0.36	0.37	0.37	0.38	0.38	0.39	0.40	0.40	0.41	0.42
Area	0.40	0.41	0.41	0.42	0.43	0.44	0.44	0.45	0.46	0.46
2	0.80	0.82	0.83	0.84	0.86	0.87	0.88	0.90	0.91	0.93
3	1.20	1.22	1.24	1.26	1.28	1.31	1.33	1.35	1.37	1.39
4	1.60	1.63	1.66	1.69	1.71	1.74	1.77	1.80	1.83	1.85
5	2.01	2.04	2.07	2.11	2.14	2.18	2.21	2.25	2.28	2.32
6	2.41	2.45	2.49	2.53	2.57	2.61	2.65	2.70	2.74	2.78
7	2.81	2.85	2.90	2.95	3.00	3.05	3.10	3.14	3.19	3.24
8	3.21	3.26	3.32	3.37	3.43	3.48	3.54	3.59	3.65	3.71
9	3.61	3.67	3.73	3.79	3.85	3.92	3.98	4.04	4.11	4.17
10	4.01	4.08	4.14	4.21	4.28	4.35	4.42	4.49	4.56	4.63
11	4.41	4.49	4.56	4.64	4.71	4.79	4.86	4.94	5.02	5.10
12	4.81	4.89	4.97	5.06	5.14	5.22	5.31	5.39	5.48	5.56
13	5.21	5.30	5.39	5.48	5.57	5.66	5.75	5.84	5.93	6.03
14	5.62	5.71	5.80	5.90	5.99	6.09	6.19	6.29	6.39	6.49
15	6.02	6.12	6.22	6.32	6.42	6.53	6.63	6.74	6.84	6.95
16	6.42	6.52	6.63	6.74	6.85	6.96	7.08	7.19	7.30	7.42
17	6.82	6.93	7.05	7.16	7.28	7.40	7.52	7.64	7.76	7.88
18	7.22	7.34	7.46	7.59	7.71	7.83	7.96	8.09	8.21	8.34
19	7.62	7.75	7.88	8.01	8.14	8.27	8.40	8.53	8.67	8.81
20	8.02	8.16	8.29	8.43	8.56	8.70	8.84	8.98	9.13	9.27
21	8.42	8.56	8.70	8.85	8.99	9.14	9.29	9.43	9.58	9.73
22	8.82	8.97	9.12	9.27	9.42	9.57	9.73	9.88	10.04	10.20
23	9.23	9.38	9.53	9.69	9.85	10.01	10.17	10.33	10.49	10.66
24	9.63	9.79	9.95	10.11	10.28	10.44	10.61	10.78	10.95	11.12
25	10.03	10.19	10.36	10.54	10.70	10.88	11.05	11.23	11.41	11.59
26	10.43	10.60	10.78	10.96	11.13	11.32	11.50	11.68	11.86	12.05
27	10.83	11.01	11.19	11.38	11.56	11.75	11.94	12.13	12.32	12.51
28	11.23	11.42	11.61	11.80	11.99	12.19	12.38	12.58	12.78	12.98
29	11.63	11.83	12.02	12.22	12.42	12.62	12.82	13.03	13.23	13.44
30	12.03	12.23	12.43	12.64	12.85	13.06	13.27	13.48	13.69	13.90
31	12.43	12.64	12.85	13.06	13.27	13.49	13.71	13.93	14.15	14.37

	13	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
.2	0.09	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.11	0.11
.3	0.14	0.15	0.14	0.15	0.15	0.15	0.15	0.16	0.16	0.16
.4	0.19	0.19	0.19	0.20	0.20	0.20	0.21	0.21	0.21	0.22
.5	0.24	0.24	0.24	0.25	0.25	0.25	0.26	0.26	0.27	0.27
.6	0.28	0.29	0.29	0.30	0.30	0.30	0.31	0.31	0.32	0.32
.7	0.33	0.33	0.34	0.34	0.35	0.36	0.36	0.37	0.37	0.38
.8	0.38	0.38	0.39	0.39	0.40	0.41	0.41	0.42	0.42	0.43
.9	0.42	0.43	0.44	0.44	0.45	0.45	0.46	0.47	0.48	0.48
Area	0.47	0.48	0.49	0.49	0.50	0.51	0.51	0.52	0.53	0.54
2	0.94	0.96	0.97	0.99	1.00	1.02	1.03	1.05	1.06	1.08
3	1.41	1.43	1.46	1.48	1.50	1.52	1.55	1.57	1.59	1.61
4	1.88	1.91	1.94	1.97	2.00	2.03	2.06	2.09	2.13	2.19
5	2.35	2.39	2.43	2.46	2.50	2.54	2.58	2.61	2.65	2.69
6	2.82	2.87	2.91	2.96	3.00	3.05	3.09	3.14	3.18	3.23
7	3.29	3.35	3.40	3.45	3.50	3.55	3.61	3.66	3.71	3.77
8	3.77	3.82	3.88	3.94	4.00	4.06	4.12	4.18	4.24	4.30
9	4.24	4.30	4.37	4.44	4.50	4.57	4.64	4.70	4.77	4.84
10	4.71	4.78	4.85	4.93	5.00	5.08	5.15	5.23	5.30	5.38
11	5.18	5.26	5.34	5.42	5.50	5.56	5.67	5.75	5.83	5.92
12	5.65	5.74	5.83	5.91	6.00	6.09	6.18	6.27	6.36	6.46
13	6.12	6.21	6.31	6.41	6.50	6.60	6.70	6.79	6.90	7.00
14	6.59	6.69	6.79	6.90	7.00	7.11	7.21	7.32	7.43	7.53
15	7.06	7.17	7.28	7.39	7.50	7.61	7.73	7.84	7.96	8.07
16	7.53	7.65	7.76	7.89	8.00	8.12	8.24	8.36	8.49	8.61
17	8.00	8.13	8.25	8.38	8.50	8.63	8.76	8.89	9.02	9.15
18	8.47	8.60	8.74	8.87	9.00	9.14	9.27	9.41	9.55	9.69
19	8.94	9.08	9.22	9.36	9.50	9.64	9.79	9.93	10.08	10.22
20	9.41	9.56	9.71	9.86	10.00	10.15	10.30	10.45	10.61	10.76
21	9.88	10.04	10.19	10.35	10.50	10.66	10.82	10.98	11.14	11.30
22	10.36	10.52	10.68	10.84	11.00	11.17	11.33	11.50	11.67	11.84
23	10.83	10.99	11.16	11.34	11.50	11.67	11.85	12.02	12.20	12.38
24	11.30	11.47	11.65	11.83	12.00	12.18	12.36	12.54	12.73	12.91
25	11.77	11.95	12.13	12.32	12.50	12.69	12.88	13.07	13.26	13.45
26	12.24	12.43	12.62	12.82	13.00	13.20	13.39	13.59	13.79	13.99
27	12.71	12.91	13.10	13.31	13.50	13.71	13.91	14.11	14.32	14.53
28	13.18	13.38	13.59	13.80	14.00	14.21	14.42	14.64	14.85	15.07
29	13.65	13.86	14.07	14.28	14.50	14.72	14.94	15.16	15.38	15.60
30	14.12	14.34	14.56	14.79	15.00	15.23	15.45	15.68	15.91	16.14
31	14.59	14.82	15.04	15.28	15.50	15.74	15.97	16.20	16.44	16.68

	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.05	0.05	0.05	0.05	0.06	0.06	0.06	0.06	0.06
.2	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12	0.12
.3	0.16	0.17	0.17	0.17	0.18	0.18	0.18	0.18	0.19
.4	0.22	0.22	0.23	0.23	0.23	0.24	0.24	0.24	0.25
.5	0.27	0.28	0.28	0.28	0.29	0.30	0.30	0.30	0.31
.6	0.33	0.33	0.34	0.34	0.35	0.36	0.36	0.36	0.37
.7	0.38	0.39	0.39	0.40	0.41	0.42	0.42	0.42	0.43
.8	0.44	0.44	0.45	0.46	0.47	0.47	0.47	0.47	0.49
.9	0.49	0.50	0.51	0.51	0.52	0.53	0.53	0.54	0.56
Area	0.54	0.55	0.56	0.57	0.58	0.59	0.59	0.60	0.61	0.62
2	1.09	1.11	1.12	1.14	1.15	1.17	1.19	1.20	1.22	1.24
3	1.64	1.66	1.68	1.71	1.73	1.76	1.78	1.80	1.83	1.85
4	2.18	2.21	2.25	2.28	2.31	2.34	2.37	2.41	2.44	2.47
5	2.73	2.77	2.81	2.85	2.89	2.93	2.97	3.00	3.05	3.09
6	3.27	3.32	3.37	3.42	3.46	3.51	3.56	3.61	3.66	3.71
7	3.82	3.88	3.93	3.99	4.04	4.10	4.15	4.21	4.27	4.33
8	4.37	4.43	4.49	4.56	4.62	4.68	4.75	4.81	4.88	4.94
9	4.91	4.98	5.05	5.13	5.20	5.27	5.34	5.42	5.49	5.56
10	5.46	5.54	5.62	5.70	5.77	5.86	5.94	6.02	6.10	6.18
11	6.00	6.09	6.18	6.26	6.35	6.44	6.53	6.62	6.71	6.80
12	6.55	6.64	6.74	6.83	6.93	7.03	7.12	7.22	7.32	7.42
13	7.10	7.20	7.30	7.40	7.51	7.61	7.72	7.82	7.93	8.04
14	7.64	7.75	7.86	7.97	8.08	8.20	8.31	8.43	8.54	8.65
15	8.19	8.31	8.42	8.54	8.66	8.78	8.90	9.03	9.15	9.27
16	8.73	8.86	8.98	9.11	9.24	9.37	9.50	9.63	9.76	9.89
17	9.28	9.41	9.55	9.68	9.82	9.96	10.09	10.23	10.37	10.51
18	9.83	9.97	10.11	10.25	10.39	10.54	10.69	10.83	10.98	11.13
19	10.37	10.52	10.67	10.82	10.97	11.13	11.28	11.43	11.59	11.74
20	10.92	11.07	11.23	11.39	11.55	11.71	11.87	12.04	12.20	12.36
21	11.46	11.63	11.79	11.96	12.13	12.30	12.47	12.64	12.81	12.98
22	12.01	12.18	12.35	12.53	12.70	12.88	13.06	13.24	13.42	13.60
23	12.55	12.73	12.92	13.19	13.28	13.47	13.66	13.83	14.03	14.22
24	13.10	13.29	13.48	13.67	13.86	14.05	14.25	14.46	14.64	14.83
25	13.65	13.84	14.04	14.24	14.44	14.64	14.84	15.05	15.25	15.45
26	14.19	14.40	14.60	14.81	15.01	15.23	15.45	15.67	15.86	16.07
27	14.74	14.95	15.16	15.38	15.59	15.81	16.03	16.27	16.47	16.69
28	15.28	15.50	15.72	15.95	16.17	16.40	16.62	16.86	17.08	17.31
29	15.83	16.05	16.28	16.52	16.75	16.98	17.22	17.46	17.69	17.92
30	16.38	16.61	16.84	17.08	17.32	17.55	17.81	18.06	18.30	18.54
31	16.92	17.16	17.41	17.65	17.90	18.15	18.41	18.67	18.91	19.16

Cylinders in Ale-Gallons.

	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.07	0.07
.2	0.13	0.13	0.13	0.13	0.13	0.14	0.14	0.14	0.14
.3	0.19	0.19	0.20	0.20	0.20	0.20	0.21	0.21	0.21
.4	0.25	0.26	0.26	0.26	0.27	0.27	0.27	0.28	0.28
.5	0.31	0.32	0.33	0.33	0.33	0.34	0.34	0.35	0.35
.6	0.38	0.38	0.39	0.39	0.40	0.40	0.41	0.41	0.42	0.42
.7	0.44	0.44	0.45	0.46	0.46	0.47	0.47	0.48	0.49	0.49
.8	0.50	0.51	0.51	0.52	0.53	0.53	0.54	0.55	0.56	0.56
.9	0.56	0.57	0.58	0.59	0.59	0.60	0.61	0.62	0.63	0.63
Area	0.63	0.63	0.64	0.65	0.66	0.67	0.68	0.69	0.70	.70
2	1.25	1.27	1.29	1.30	1.32	1.34	1.36	1.37	1.39	1.41
3	1.88	1.90	1.93	1.96	1.98	2.01	2.03	2.06	2.09	2.11
4	2.51	2.54	2.57	2.61	2.64	2.68	2.71	2.75	2.78	2.82
5	3.13	3.17	3.22	3.26	3.30	3.35	3.39	3.43	3.48	3.52
6	3.76	3.81	3.86	3.91	3.96	4.01	4.07	4.12	4.17	4.22
7	4.39	4.44	4.50	4.56	4.62	4.68	4.74	4.81	4.87	4.93
8	5.01	5.08	5.15	5.22	5.28	5.35	5.42	5.49	5.56	5.63
9	5.64	5.71	5.79	5.87	5.94	6.02	6.10	6.18	6.26	6.34
10	6.27	6.35	6.43	6.52	6.60	6.69	6.78	6.86	6.95	7.04
11	6.85	6.98	7.08	7.17	7.27	7.36	7.46	7.55	7.65	7.74
12	7.52	7.62	7.72	7.82	7.93	8.03	8.13	8.24	8.34	8.45
13	8.15	8.25	8.37	8.48	8.59	8.70	8.81	8.92	9.04	9.15
14	8.77	8.89	9.01	9.13	9.25	9.37	9.49	9.61	9.73	9.86
15	9.40	9.52	9.65	9.78	9.91	10.04	10.17	10.30	10.43	10.56
16	10.03	10.16	10.30	10.43	10.57	10.71	10.84	10.98	11.12	11.27
17	10.65	10.79	10.94	11.08	11.23	11.37	11.52	11.67	11.82	11.97
18	11.28	11.43	11.58	11.74	11.89	12.04	12.20	12.36	12.52	12.67
19	11.91	12.06	12.23	12.39	12.55	12.71	12.88	13.04	13.21	13.38
20	12.53	12.70	12.87	13.04	13.21	13.38	13.56	13.73	13.91	14.08
21	13.16	13.33	13.51	13.69	13.87	14.05	14.23	14.42	14.60	14.79
22	13.78	13.97	14.16	14.34	14.53	14.72	14.91	15.10	15.30	15.49
23	14.41	14.60	14.80	15.00	15.19	15.39	15.59	15.79	15.99	16.19
24	15.04	15.24	15.44	15.65	15.85	16.06	16.27	16.48	16.69	16.90
25	15.66	15.87	16.09	16.30	16.51	16.73	16.94	17.16	17.38	17.60
26	16.29	16.51	16.73	16.95	17.17	17.40	17.62	17.85	18.08	18.31
27	16.92	17.14	17.37	17.60	17.83	18.07	18.30	18.54	18.77	19.01
28	17.54	17.78	18.02	18.26	18.49	18.73	18.98	19.22	19.47	19.71
29	18.17	18.41	18.66	18.91	19.15	19.40	19.66	19.91	20.16	20.42
30	18.80	19.05	19.30	19.56	19.81	20.07	20.33	20.59	20.86	21.12
31	19.42	19.68	19.95	20.21	20.48	20.74	21.01	21.28	21.55	21.83

Cylinders *in Ale-Gallons.*

	16	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.07	0.07	0.07	0.07	0.07	0.08	0.08	0.08	0.08	0.08
.2	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16
.3	0.21	0.22	0.22	0.22	0.22	0.23	0.23	0.23	0.24	0.24
.4	0.29	0.29	0.29	0.30	0.30	0.30	0.31	0.31	0.31	0.32
.5	0.36	0.36	0.37	0.37	0.37	0.38	0.38	0.39	0.39	0.40
.6	0.43	0.43	0.44	0.44	0.45	0.45	0.46	0.47	0.47	0.48
.7	0.50	0.50	0.51	0.52	0.52	0.53	0.54	0.54	0.55	0.56
.8	0.57	0.58	0.58	0.59	0.60	0.61	0.61	0.62	0.63	0.64
.9	0.64	0.65	0.66	0.67	0.67	0.68	0.69	0.70	0.71	0.72
Area	0.71	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.79	0.80
2	1.43	1.44	1.46	1.48	1.50	1.52	1.53	1.55	1.57	1.59
3	2.14	2.17	2.19	2.22	2.25	2.27	2.30	2.33	2.36	2.39
4	2.85	2.89	2.92	2.96	3.00	3.03	3.07	3.11	3.14	3.18
5	3.56	3.61	3.65	3.70	3.75	3.79	3.84	3.88	3.93	3.98
6	4.28	4.33	4.39	4.44	4.49	4.55	4.60	4.66	4.72	4.77
7	4.99	5.05	5.12	5.18	5.24	5.31	5.37	5.44	5.50	5.57
8	5.70	5.77	5.85	5.92	5.99	6.07	6.14	6.21	6.29	6.36
9	6.42	6.50	6.58	6.66	6.74	6.82	6.91	6.99	7.07	7.16
10	7.13	7.22	7.31	7.40	7.49	7.58	7.67	7.77	7.86	7.95
11	7.84	7.94	8.04	8.14	8.24	8.34	8.44	8.54	8.65	8.75
12	8.56	8.66	8.77	8.88	8.99	9.10	9.21	9.32	9.43	9.55
13	9.27	9.38	9.50	9.62	9.74	9.86	9.98	10.10	10.22	10.34
14	9.98	10.11	10.23	10.36	10.49	10.61	10.74	10.87	11.01	11.14
15	10.69	10.83	10.96	11.10	11.24	11.37	11.51	11.65	11.79	11.93
16	11.41	11.55	11.69	11.84	11.99	12.13	12.28	12.43	12.58	12.73
17	12.12	12.27	12.43	12.58	12.73	12.89	13.05	13.20	13.36	13.52
18	12.83	12.99	13.16	13.32	13.48	13.65	13.81	13.98	14.15	14.32
19	13.55	13.72	13.89	14.06	14.23	14.41	14.58	14.76	14.94	15.11
20	14.26	14.44	14.62	14.80	14.98	15.16	15.35	15.53	15.72	15.91
21	24.97	15.16	15.35	15.54	15.73	15.92	16.12	16.31	16.51	16.71
22	15.69	15.88	16.08	16.28	16.48	16.68	16.88	17.09	17.29	17.50
23	16.40	16.60	16.80	17.02	17.23	17.44	17.65	17.86	18.08	18.30
24	17.11	17.33	17.54	17.76	17.98	18.20	18.42	18.64	18.87	19.09
25	17.82	18.05	18.27	18.50	18.73	18.95	19.19	19.42	19.65	19.89
26	18.54	18.77	19.00	19.24	19.48	19.71	19.95	20.19	20.44	20.68
27	19.25	19.49	19.73	19.98	20.23	20.47	20.72	20.97	21.22	21.48
28	19.96	20.21	20.46	20.72	20.97	21.23	21.49	21.75	22.01	22.27
29	20.68	20.93	21.20	21.46	21.72	21.99	22.26	22.52	22.80	23.07
30	21.39	21.66	21.93	22.20	22.47	22.75	23.02	23.30	23.58	23.86
31	22.10	22.38	22.66	22.94	23.22	23.50	23.79	24.08	24.37	24.66

	.1	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.08	0.08	0.08	0.80	0.08	0.09	0.09	0.09	0.09	0.09
.2	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17	0.18	0.18
.3	0.24	0.24	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.27
.4	0.32	0.33	0.33	0.33	0.34	0.34	0.34	0.35	0.35	0.36
.5	0.40	0.41	0.41	0.42	0.42	0.43	0.43	0.44	0.44	0.45
.6	0.48	0.49	0.49	0.50	0.51	0.51	0.52	0.52	0.53	0.54
.7	0.56	0.57	0.58	0.58	0.59	0.60	0.60	0.61	0.62	0.62
.8	0.64	0.65	0.66	0.67	0.67	0.68	0.69	0.70	0.71	0.71
.9	0.72	0.73	0.74	0.75	0.76	0.77	0.78	0.78	0.79	0.80
Area	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89
2	1.61	1.63	1.65	1.67	1.69	1.71	1.73	1.74	1.76	1.78
3	2.41	2.44	2.47	2.50	2.53	2.56	2.59	2.62	2.65	2.68
4	3.22	3.26	3.30	3.33	3.37	3.41	3.45	3.49	3.53	3.57
5	4.02	4.07	4.12	4.17	4.21	4.26	4.31	4.36	4.41	4.46
6	4.82	4.89	4.94	5.00	5.06	5.12	5.18	5.23	5.29	5.35
7	5.63	5.70	5.77	5.83	5.90	5.97	6.04	6.11	6.18	6.25
8	6.44	6.51	6.59	6.67	6.75	6.82	6.90	6.98	7.06	7.14
9	7.24	7.33	7.41	7.50	7.59	7.68	7.76	7.85	7.94	8.03
10	8.05	8.14	8.24	8.34	8.43	8.53	8.63	8.72	8.82	8.92
11	8.85	8.96	9.06	9.17	9.27	9.38	9.49	9.60	9.71	9.82
12	9.66	9.77	9.89	10.00	10.12	10.23	10.35	10.47	10.59	10.71
13	10.46	10.59	10.71	10.84	10.96	11.09	11.21	11.34	11.47	11.60
14	11.27	11.40	11.53	11.67	11.80	11.94	12.08	12.21	12.35	12.49
15	12.07	12.22	12.36	12.50	12.65	12.79	12.94	13.09	13.24	13.39
16	12.88	13.03	13.18	13.34	13.49	13.65	13.80	13.96	14.12	14.28
17	13.68	13.84	14.01	14.17	14.33	14.50	14.67	14.83	15.00	15.17
18	14.49	14.66	14.83	15.00	15.18	15.35	15.53	15.70	15.88	16.06
19	15.29	15.47	15.65	15.84	16.02	16.20	16.39	16.58	16.77	16.96
20	16.10	16.29	16.48	16.67	16.86	17.06	17.25	17.45	17.65	17.85
21	16.90	17.10	17.30	17.51	17.71	17.91	18.12	18.32	18.53	18.74
22	17.71	17.92	18.13	18.34	18.55	18.76	18.98	19.19	19.41	19.63
23	18.51	18.73	18.95	19.17	19.39	19.62	19.84	20.07	20.29	20.52
24	19.32	19.55	19.77	20.01	20.24	20.47	20.70	20.94	21.18	21.42
25	20.12	20.36	20.60	20.84	21.08	21.32	21.57	21.81	22.06	22.31
26	20.93	21.17	21.42	21.67	21.92	22.18	22.43	22.68	22.94	23.20
27	21.73	21.99	22.25	22.51	22.77	23.03	23.29	23.56	23.82	24.09
28	22.54	22.80	23.07	23.34	23.61	23.88	24.16	24.43	24.71	24.99
29	23.34	23.62	23.89	24.17	24.45	24.73	25.02	25.30	25.59	25.88
30	24.15	24.43	24.72	25.01	25.30	25.59	25.88	26.17	26.47	26.77
31	24.95	25.25	25.54	25.84	26.14	26.44	26.74	27.05	27.35	27.66

	.8	.1	.2	.3	.4	5.	6.	7.	8.	.9
.1	0.09	0.09	0.09	0.09	0.09	0.10	0.10	0.10	0 .10	0.10
.2	0.18	0.18	0.18	0.19	0.19	0.19	0.19	0.19	0.20	0.20
.3	0.27	0.27	0.28	0.28	0.28	0.29	0.29	0.29	0.30	0.30
.4	0.36	0.36	0.37	0.37	0.38	0.38	0.39	0.39	0.39	0.40
.5	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.49	0.49	0.50
.6	0.54	0.55	0.55	0.56	0.57	0.57	0.58	0.58	0.59	0.60
.7	0.63	0.64	0.65	0.65	0.66	0.67	0.67	0.68	0.69	0.70
.8	0.72	0.73	0.74	0.75	0.75	0.76	0.77	0.78	0.79	0.80
.9	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
Area	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99
2	1.80	1.82	1.84	1.87	1.89	1.91	1.93	1.95	1.97	1.99
3	2.71	2.74	2.77	2.80	2.83	2.86	2.89	2.92	2.95	2.98
4	3.61	3.64	3.69	3.73	3.77	3.81	3.85	3.90	3.94	3.98
5	4.51	4.56	4.61	4.66	4.71	4.77	4.82	4.87	4.92	4.97
6	5.41	5.47	5.53	5.60	5.66	5.72	5.78	5.84	5.91	5.97
7	6.32	6.39	6.46	6.53	6.60	6.67	6.74	6.82	6.89	6.96
8	7.22	7.30	7.38	7.46	7.54	7.63	7.71	7.79	7.88	7.96
9	8.12	8.21	8.30	8.39	8.49	8.58	8.69	8.76	8.86	8.95
10	9.02	9.12	9.22	9.33	9.43	9.53	9.63	9.74	9.84	9.95
11	9.93	10.04	10.15	10.26	10.37	10.49	10.60	10.71	10.83	10.94
12	10.83	10.95	11.07	11.19	11.31	11.44	11.56	11.69	11.81	11.94
13	11.73	11.86	11.99	12.12	12.26	12.39	12.53	12.66	12.80	12.93
14	12.63	12.77	12.91	13.06	13.20	13.34	13.49	13.63	13.78	13.93
15	13.54	13.69	13.84	13.99	14.14	14.30	14.45	14.61	14.77	14.92
16	14.44	14.60	14.76	14.92	15.09	15.25	15.42	15.58	15.75	15.92
17	15.34	15.51	15.68	15.86	16.03	16.20	16.38	16.55	16.73	16.91
18	16.24	16.42	16.60	16.79	16.97	17.16	17.34	17.53	17.72	17.91
19	17.15	17.34	17.53	17.72	17.91	18.11	18.31	18.50	18.70	18.90
20	18.05	18.25	18.45	18.65	18.86	19.06	19.27	19.48	19.69	19.90
21	18.95	19.16	19.37	19.59	19.80	20.02	20.23	20.45	20.67	20.89
22	19.85	20.07	20.29	20.52	20.74	20.97	21.20	21.42	21.66	21.89
23	20.76	20.99	21.22	21.45	21.69	21.92	22.16	22.40	22.64	22.88
24	21.66	21.90	22.14	22.38	22.63	22.88	23.12	23.37	23.63	23.88
25	22.56	22.81	23.06	23.32	23.57	23.83	24.09	24.35	24.61	24.87
26	23.46	23.72	23.98	24.25	24.52	24.78	25.05	25.32	25.59	25.87
27	24.36	24.63	24.91	25.18	25.46	25.74	26.01	26.90	26.58	26.86
28	25.27	25.55	25.83	26.12	26.40	26.69	26.98	27.27	27.56	27.86
29	26.17	26.46	26.75	27.05	27.34	27.64	27.94	28.24	28.55	28.85
30	27.07	27.37	27.67	27.98	28.28	28.60	28.90	29.22	29.53	29.85
31	27.97	28.28	28.60	28.91	29.23	29.55	29.87	30.19	30.52	30.84

0.	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.10	0.10	0.10	0.10	0.11	0.11	0.11	0.11	0.11
.2	0.20	0.20	0.21	0.21	0.21	0.21	0.21	0.22	0.22	0.22
.3	0.30	0.30	0.31	0.31	0.31	0.32	0.32	0.32	0.33	0.33
.4	0.40	0.41	0.41	0.41	0.42	0.42	0.43	0.43	0.44	0.44
.5	0.50	0.51	0.51	0.52	0.52	0.53	0.53	0.54	0.55	0.55
.6	0.60	0.61	0.62	0.62	0.63	0.64	0.64	0.65	0.65	0.66
.7	0.70	0.71	0.72	0.73	0.73	0.74	0.75	0.76	0.76	0.77
.8	0.80	0.81	0.82	0.83	0.84	0.85	0.86	0.86	0.87	0.88
.9	0.90	0.91	0.92	0.93	0.94	0.95	0.96	0.97	0.98	0.99
Area	1.00	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10
2	2.01	2.03	2.05	2.08	2.10	2.12	2.14	2.16	2.18	2.21
3	3.02	3.05	3.08	3.11	3.14	3.18	3.21	3.24	3.28	3.31
4	4.02	4.06	4.11	4.15	4.19	4.24	4.28	4.32	4.37	4.41
5	5.03	5.08	5.13	5.19	5.24	5.29	5.35	5.40	5.46	5.51
6	6.03	6.10	6.16	6.23	6.29	6.35	6.42	6.49	6.55	6.62
7	7.04	7.11	7.19	7.26	7.34	7.41	7.49	7.57	7.64	7.72
8	8.04	8.13	8.21	8.30	8.39	8.47	8.56	8.65	8.74	8.82
9	9.05	9.14	9.24	9.34	9.43	9.53	9.63	9.73	9.83	9.93
10	10.05	10.16	10.27	10.38	10.48	10.59	10.70	10.81	10.92	11.03
11	11.06	11.18	11.29	11.41	11.53	11.65	11.77	11.89	12.01	12.13
12	12.06	12.19	12.32	12.45	12.58	12.71	12.84	12.97	13.10	13.23
13	13.07	13.21	13.35	13.49	13.63	13.77	13.91	14.05	14.19	14.34
14	14.08	14.22	14.37	14.53	14.67	14.83	14.98	15.13	15.29	15.44
15	15.08	15.24	15.40	15.57	15.72	15.88	16.05	16.21	16.38	16.54
16	16.09	16.26	16.43	16.60	16.77	16.94	17.12	17.29	17.47	17.65
17	17.09	17.27	17.45	17.64	17.82	18.00	18.19	18.38	18.56	18.75
18	18.10	18.29	18.48	18.68	18.87	19.06	19.26	19.46	19.65	19.85
19	19.10	19.30	19.51	19.72	19.92	20.12	20.33	20.54	20.75	20.95
20	20.11	20.32	20.53	20.75	20.96	21.18	21.40	21.62	21.84	22.06
21	21.11	21.34	21.56	21.79	22.01	22.24	22.47	22.70	22.93	23.16
22	22.12	22.35	22.59	22.83	23.06	23.30	23.54	23.78	24.02	24.26
23	23.12	23.37	23.61	23.87	24.11	24.36	24.61	24.86	25.11	25.37
24	24.13	24.38	24.64	24.90	25.16	25.42	25.68	25.94	26.21	26.47
25	25.13	25.40	25.67	25.94	26.20	26.47	26.75	27.02	27.30	27.57
26	26.14	26.42	26.69	26.98	27.25	27.53	27.82	28.10	28.39	28.68
27	27.15	27.43	27.72	28.02	28.30	28.59	28.89	29.18	29.48	29.78
28	28.15	28.45	28.75	29.06	29.35	29.65	29.96	30.27	30.57	30.88
29	29.16	29.46	29.77	30.03	30.40	30.71	31.03	31.35	31.66	31.98
30	30.16	30.48	30.80	31.13	31.45	31.77	32.10	32.43	32.76	33.09
31	31.17	31.50	31.83	32.17	32.49	32.83	33.17	33.51	33.85	34.19

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.11	0.11	0.11	0.11	0.11	0.11	0.12	0.12	0.12	0.12
.2	0.22	0.22	0.23	0.23	0.23	0.23	0.24	0.24	0.24	0.24
.3	0.33	0.34	0.34	0.34	0.35	0.35	0.35	0.36	0.36	0.36
.4	0.45	0.45	0.45	0.46	0.46	0.47	0.47	0.48	0.48	0.49
.5	0.56	0.56	0.57	0.57	0.58	0.58	0.59	0.60	0.60	0.61
.6	0.67	0.67	0.68	0.69	0.70	0.70	0.71	0.72	0.72	0.73
.7	0.78	0.79	0.80	0.80	0.81	0.82	0.83	0.84	0.84	0.85
.8	0.89	0.90	0.91	0.92	0.93	0.94	0.95	0.95	0.96	0.97
.9	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09
Area	1.11	1.12	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.22
2	2.23	2.25	2.27	2.30	2.32	2.34	2.36	2.39	2.41	2.43
3	3.34	3.38	3.41	3.44	3.48	3.51	3.55	3.58	3.61	3.65
4	4.46	4.50	4.54	4.59	4.64	4.68	4.73	4.77	4.82	4.87
5	5.57	5.63	5.68	5.74	5.79	5.85	5.91	5.97	6.02	6.08
6	6.68	6.75	6.82	6.89	6.95	7.02	7.09	7.16	7.23	7.30
7	7.80	7.88	7.95	8.03	8.11	8.20	8.27	8.35	8.43	8.52
8	8.91	9.00	9.09	9.18	9.27	9.36	9.45	9.55	9.64	9.73
9	10.03	10.13	10.23	10.33	10.43	10.53	10.64	10.74	10.84	10.90
10	11.14	11.25	11.36	11.48	11.59	11.70	11.82	11°93	12.05	12.17
11	12.25	12.38	12.50	12.62	12.75	12.87	13.00	13.13	13.25	13.38
12	13.37	13.50	13.63	13.77	13.91	14.04	14.18	14.32	14.46	14.60
13	14.48	14.63	14.77	14.92	15.07	15.21	15.36	15.51	15.66	15.81
14	15.60	15.75	15.91	16.08	16.23	16.39	16.55	16.71	16.87	17.03
15	16.71	16.88	17.04	17.22	17.38	17.56	17.73	17.90	18.07	18.25
16	17.82	18.00	18.18	18.36	18.54	18.73	18.91	19.09	19.28	19.46
17	18.94	19.13	19.32	19.51	19.70	19.90	20.09	20.29	20.48	20.68
18	20.05	20.25	20.45	20.66	20.86	21.07	21.27	21.48	21.69	21.90
19	21.17	21.38	21.59	21.81	22.02	22.24	22.46	22.67	22.89	23.11
20	22.28	22.50	22.73	22.95	23.18	23.41	23.64	23.87	24.10	24.33
21	23.39	23.63	23.86	24.10	24.34	24.58	24.82	25.06	25.30	25.55
22	24.51	24.75	25.00	25.25	25.50	25.75	26.00	26.25	26.51	26.76
23	25.62	25.88	26·13	26.40	26.66	26.92	27.18	27.45	27.71	27.98
24	26.74	27.00	27.27	27.54	27.82	28.09	28.37	28.64	28.92	29.20
25	27.85	28.13	28.41	28.69	28.97	29.26	29.55	29.83	30.12	30.41
26	28.96	29.26	29.54	29.84	30.13	30.43	30.73	31.03	31.33	31.63
27	30.08	30.38	30.68	30.99	31.29	31.60	31.91	32.22	32.53	32.85
28	31.19	31.51	31.82	32.13	32.45	32.77	33.09	33.41	33.74	34.06
29	32.31	32.63	32.95	33.28	33.61	33.94	34.27	34.61	34.94	35.28
30	33.42	33.76	34.09	34.43	34.77	35.11	35.46	35.80	36.15	36.50
31	34.53	34.88	35.23	35.58	35.93	36.28	36.64	37.00	37.35	37.72

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.12	0.12	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13
.2	0.25	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.26	0.27
.3	0.37	0.37	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.40
.4	0.49	0.50	0.50	0.50	0.51	0.51	0.52	0.52	0.53	0.53
.5	0.61	0.62	0.63	0.63	0.64	0.64	0.65	0.66	0.66	0.67
.6	0.74	0.74	0.75	0.76	0.77	0.77	0.78	0.79	0.79	0.80
.7	0.86	0.87	0.88	0.88	0.89	0.90	0.91	0.92	0.93	0.93
.8	0.98	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07
.9	1.11	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20
Area	1.23	1.24	1.25	1.26	1.27	1.29	1.30	1.31	1.32	1.34
2	2.46	2.48	2.50	2.53	2.55	2.57	2.60	2.62	2.65	2.67
3	3.68	3.72	3.75	3.78	3.83	3.86	3.90	3.93	3.97	4.01
4	4.91	4.96	5.01	5.04	5.10	5.15	5.20	5.25	5.29	5.34
5	6.14	6.20	6.26	6.31	6.38	6.44	6.50	6.56	6.62	6.68
6	7.37	7.44	7.51	7.57	7.65	7.72	7.80	7.87	7.94	8.01
7	8.60	8.68	8.76	8.83	8.93	9.01	9.09	9.18	9.26	9.35
8	9.82	9.92	10.01	10.09	10.20	10.30	10.39	10.49	10.59	10.69
9	11.05	11.16	11.26	11.36	11.48	11.59	11.69	11.80	11.91	12.02
10	12.28	12.40	12.51	12.63	12.75	12.87	12.99	13.11	13.24	13.36
11	13.51	13.64	13.77	13.89	14.03	14.16	14.29	14.43	14.56	14.69
12	14.74	14.88	15.02	15.15	15.31	15.45	15.59	15.74	15.89	16.03
13	15.97	16.12	16.27	16.42	16.58	16.74	16.89	17.05	17.21	17.37
14	17.19	17.36	17.52	17.68	17.86	18.02	18.19	18.36	18.53	18.70
15	18.42	18.60	18.77	18.94	19.13	19.31	19.49	19.67	19.85	20.04
16	19.69	19.84	20.03	20.21	20.41	20.60	20.79	20.98	21.18	21.37
17	20.88	21.08	21.28	21.47	21.68	21.89	22.09	22.29	22.50	22.71
18	22.11	22.32	22.53	22.73	22.96	23.17	23.39	23.60	23.82	24.04
19	23.33	23.56	23.78	24.00	24.23	24.46	24.69	24.92	25.15	25.38
20	24.56	24.80	25.03	25.26	25.51	25.75	25.99	26.23	26.47	26.72
21	25.79	26.04	26.28	26.52	26.78	27.04	27.29	27.54	27.79	28.05
22	27.02	27.28	27.54	27.79	28.06	28.32	28.59	28.85	29.12	29.39
23	28.25	28.52	28.79	29.05	29.34	29.61	29.89	30.16	30.44	30.72
24	29.48	29.76	30.04	30.32	30.61	30.90	31.18	31.47	31.77	32.06
25	30.70	31.00	31.29	31.58	31.89	32.18	32.48	32.79	33.09	33.40
26	31.93	32.24	32.54	32.84	33.16	33.47	33.78	34.10	34.41	34.73
27	33.16	33.48	33.79	34.11	34.44	34.76	35.08	35.41	35.74	36.07
28	34.39	34.72	35.05	35.37	35.71	36.05	36.38	36.72	37.06	37.40
29	35.62	35.96	36.30	36.63	36.99	37.33	37.68	38.03	38.38	38.74
30	36.85	37.20	37.55	37.90	38.26	38.62	38.98	39.34	39.71	40.07
31	38.08	38.44	38.80	39.16	39.54	39.91	40.28	40.66	41.03	41.41

	22	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.13	0.13	0.14	0.14	0.14	0.14	0.14	0.14	0.14	0.14
.2	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.29	0.29	0.29
.3	0.40	0.41	0.41	0.42	0.42	0.42	0.43	0.43	0.43	0.44
.4	0.54	0.54	0.55	0.55	0.56	0.56	0.57	0.57	0.58	0.58
.5	0.67	0.68	0.69	0.69	0.70	0.70	0.71	0.72	0.72	0.73
.6	0.81	0.82	0.82	0.83	0.84	0.85	0.85	0.86	0.87	0.88
.7	0.94	0.95	0.95	0.97	0.98	0.99	1.00	1.00	1.01	1.02
.8	1.08	1.09	1.10	1.11	1.13	1.13	1.14	1.15	1.16	1.17
.9	1.21	1.22	1.22	1.25	1.27	1.27	1.28	1.29	1.30	1.31
Area	1.35	1.36	1.37	1.38	1.40	1.41	1.42	1.44	1.45	1.46
2	2.70	2.72	2.74	2.77	2.79	2.82	2.84	2.87	2.89	2.92
3	4.04	4.08	4.12	4.15	4.19	4.23	4.27	4.31	4.34	4.38
4	5.39	5.44	5.49	5.54	5.59	5.64	5.69	5.74	5.79	5.84
5	6.74	6.80	6.86	6.92	6.99	7.05	7.11	7.18	7.24	7.30
6	8.09	8.16	8.24	8.31	8.38	8.46	8.53	8.61	8.69	8.76
7	9.44	9.52	9.61	9.69	9.78	9.87	9.96	10.00	10.13	10.22
8	10.78	10.88	10.98	11.08	11.18	11.28	11.38	11.48	11.58	11.68
9	12.13	12.24	12.35	12.46	12.58	12.69	12.80	12.92	13.03	13.14
10	13.48	13.60	13.73	13.85	13.97	14.10	14.22	14.35	14.48	14.62
11	14.83	14.96	15.10	15.23	15.37	15.51	15.65	15.79	15.92	16.07
12	16.18	16.32	16.47	16.62	16.77	16.92	17.07	17.21	17.37	17.53
13	17.52	17.68	17.84	18.00	18.17	18.33	18.49	18.66	18.82	18.99
14	18.87	19.04	19.22	19.39	19.56	19.74	19.91	20.01	20.27	20.45
15	20.22	20.40	20.59	20.77	20.96	21.15	21.34	21.53	21.72	21.91
16	21.57	21.76	21.96	22.16	22.36	22.56	22.76	22.96	23.16	23.37
17	22.92	23.12	23.33	23.54	23.76	23.97	24.18	24.40	24.61	24.83
18	24.26	24.48	24.71	24.93	25.15	25.38	25.60	25.83	26.06	26.30
19	25.61	25.84	26.08	26.31	26.55	26.79	27.03	27.27	27.51	27.75
20	26.96	27.20	27.45	27.70	27.95	28.20	28.45	28.70	28.96	29.21
21	28.31	28.56	28.83	29.08	29.35	29.61	29.87	30.14	30.40	30.67
22	29.66	29.92	30.20	30.47	30.74	31.02	31.29	31.57	31.85	32.13
23	31.00	31.28	31.57	31.85	32.14	32.43	32.72	33.01	33.30	33.59
24	32.35	32.64	32.94	33.24	33.54	33.84	34.14	34.44	34.75	35.05
25	33.70	34.00	34.32	34.62	34.94	35.25	35.56	35.88	36.19	36.51
26	35.05	35.37	35.69	36.01	36.33	36.66	36.98	37.31	37.64	37.97
27	36.40	36.73	37.06	37.39	37.73	38.07	38.41	38.75	39.09	39.43
28	37.74	38.09	38.43	38.78	39.13	39.48	39.83	40.18	40.54	40.89
29	39.09	39.45	39.81	40.16	40.53	40.90	41.25	41.62	41.99	42.39
30	40.44	40.81	41.18	41.55	41.92	42.30	42.67	43.05	43.43	43.82
31	41.79	42.17	42.55	42.93	43.32	43.71	44.10	44.49	44.88	45.28

23	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.16	0.16
.2	0.29	0.30	0.30	0.30	0.30	0.31	0.31	0.32	0.32
.3	0.44	0.45	0.45	0.45	0.46	0.46	0.47	0.47	0.48
.4	0.59	0.59	0.60	0.60	0.61	0.61	0.62	0.63	0.64
.5	0.74	0.74	0.75	0.76	0.76	0.77	0.78	0.78	0.80
.6	0.88	0.89	0.90	0.91	0.91	0.92	0.93	0.94	0.95	0.95
.7	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.10	1.11
.8	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25	1.26	1.27
.9	1.33	1.34	1.35	1.36	1.37	1.38	1.40	1.41	1.42	1.43
Area	1.47	1.49	1.50	1.51	1.52	1.53	1.55	1.56	1.58	1.59
2	2.95	2.97	3.00	3.02	3.05	3.08	3.10	3.13	3.15	3.18
3	4.42	4.45	4.50	4.54	4.57	4.61	4.65	4.69	4.73	4.77
4	5.89	5.94	6.00	6.05	6.10	6.15	6.20	6.26	6.31	6.36
5	7.37	7.43	7.50	7.56	7.62	7.69	7.76	7.82	7.89	7.95
6	8.84	8.92	8.99	9.07	9.15	9.23	9.31	9.39	9.47	9.54
7	10.31	10.40	10.49	10.58	10.67	10.77	10.86	10.95	11.04	11.14
8	11.79	11.89	11.99	12.10	12.20	12.30	12.41	12.51	12.62	12.73
9	13.26	13.37	13.49	13.61	13.72	13.84	13.96	14.08	14.20	14.32
10	14.73	14.86	14.99	15.12	15.25	15.38	15.51	15.64	15.78	15.91
11	16.21	16.35	16.49	16.63	16.77	16.92	17.06	17.21	17.35	17.50
12	17.68	17.83	17.99	18.14	18.30	18.46	18.61	18.77	18.93	19.09
13	19.15	19.32	19.49	19.66	19.82	19.99	20.17	20.34	20.51	20.68
14	20.62	20.81	20.99	21.17	21.35	21.53	21.72	21.90	22.09	22.27
15	22.10	22.29	22.49	22.68	22.87	23.07	23.27	23.47	23.66	23.86
16	23.57	23.78	23.99	24.19	24.40	24.61	24.82	25.03	25.24	25.45
17	25.05	25.26	25.48	25.70	25.92	26.15	26.37	26.59	26.82	27.04
18	26.52	26.75	26.98	27.22	27.45	27.69	27.92	28.16	28.40	28.64
19	27.99	28.24	28.48	28.73	28.97	29.22	29.47	29.72	29.97	30.23
20	29.47	29.72	29.98	30.24	30.50	30.76	31.02	31.29	31.55	31.82
21	30.94	31.21	31.48	31.75	32.02	32.30	32.57	32.85	33.13	33.41
22	32.41	32.69	32.98	33.26	33.55	33.84	34.13	34.32	34.71	35.00
23	33.89	34.18	34.48	34.78	35.07	35.38	35.68	35.98	36.28	36.59
24	35.36	35.67	35.98	36.29	36.60	36.91	37.23	37.55	37.86	38.18
25	36.83	37.15	37.48	37.80	38.12	38.45	38.78	39.11	39.44	39.77
26	38.31	38.64	38.98	39.31	39.65	39.99	40.33	40.67	41.02	41.36
27	39.78	40.12	40.48	40.82	41.17	41.53	41.88	42.24	42.59	42.95
28	41.25	41.61	41.97	42.34	42.70	43.07	43.43	43.80	44.17	44.54
29	42.73	43.10	43.47	43.85	44.22	44.60	44.98	45.37	45.75	46.13
30	44.20	44.58	44.97	45.35	45.75	46.14	46.54	46.93	47.33	47.73
31	45.67	46.07	46.47	46.87	47.27	47.68	48.09	48.50	48.91	49.32

	24	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.16	0.16	0.16	0.16	0.16	0.17	0.17	0.17	0.17	0.17
.2	0.32	0.32	0.32	0.33	0.33	0.33	0.34	0.34	0.34	0.34
.3	0.48	0.49	0.49	0.49	0.50	0.50	0.51	0.51	0.51	0.52
.4	0.64	0.65	0.65	0.66	0.66	0.67	0.67	0.68	0.69	0.69
.5	0.80	0.81	0.82	0.82	0.83	0.84	0.84	0.85	0.86	0.86
.6	0.96	0.97	0.98	0.99	0.99	1.00	1.01	1.02	1.03	1.04
.7	1.12	1.13	1.14	1.15	1.16	1.17	1.18	1.19	1.20	1.21
.8	1.28	1.29	1.30	1.32	1.33	1.34	1.35	1.36	1.37	1.38
.9	1.44	1.46	1.47	1.48	1.49	1.50	1.52	1.53	1.54	1.55
Area	1.60	1.62	1.63	1.64	1.66	1.67	1.68	1.70	1.71	1.73
2	3.21	3.23	3.26	3.29	3.32	3.34	3.37	3.40	3.43	3.45
3	4.81	4.85	4.89	4.93	4.97	5.02	5.06	5.10	5.14	5.18
4	6.42	6.47	6.52	6.58	6.63	6.69	6.74	6.80	6.85	6.91
5	8.02	8.09	8.16	8.22	8.29	8.36	8.43	8.50	8.56	8.63
6	9.63	9.71	9.79	9.87	9.95	10.03	10.11	10.19	10.28	10.36
7	11.23	11.32	11.42	11.51	11.61	11.70	11.80	11.89	11.99	12.09
8	12.83	12.94	13.05	13.16	13.26	13.37	13.48	13.59	13.70	13.81
9	14.44	14.56	14.68	14.80	14.92	15.05	15.17	15.29	15.42	15.54
10	16.04	16.18	16.31	16.45	16.58	16.72	16.85	16.99	17.13	17.27
11	17.65	17.79	17.94	18.09	18.24	18.39	18.54	18.69	18.84	18.99
12	19.25	19.41	19.57	19.74	19.90	20.06	20.22	20.39	20.55	20.72
13	20.85	21.03	21.20	21.38	21.56	21.73	21.91	22.09	22.27	22.45
14	22.46	22.65	22.84	23.03	23.21	23.40	23.60	23.79	23.98	24.18
15	24.06	24.26	24.47	24.67	24.87	25.08	25.28	25.49	25.69	25.90
16	25.67	25.88	26.10	26.31	26.53	26.75	26.97	27.19	27.41	27.63
17	27.27	27.50	27.73	27.96	28.19	28.42	28.65	28.88	29.12	29.36
18	28.88	29.12	29.36	29.60	29.85	30.09	30.34	30.58	30.83	31.08
19	30.48	30.73	30.92	31.25	31.50	31.76	32.02	32.28	32.54	32.81
20	32.08	32.35	32.62	32.89	33.16	33.44	33.71	33.98	34.26	34.54
21	33.69	33.97	34.25	34.54	34.82	35.11	35.39	35.68	35.97	36.26
22	35.29	35.59	35.88	36.18	36.48	36.78	37.08	37.38	37.68	37.99
23	36.90	37.20	37.51	37.83	38.14	38.45	38.76	39.08	39.40	39.72
24	38.50	38.82	39.15	39.47	39.79	40.12	40.45	40.78	41.11	41.44
25	40.10	40.44	40.78	41.12	41.45	41.79	42.13	42.48	42.82	43.17
26	41.71	42.06	42.41	42.76	43.11	43.47	43.82	44.18	44.54	44.90
27	43.31	43.68	44.04	44.41	44.77	45.14	45.51	45.88	46.25	46.62
28	44.92	45.29	45.67	46.05	46.43	46.81	47.19	47.57	47.96	48.35
29	46.52	46.91	47.30	47.70	48.08	48.48	48.88	49.27	49.67	50.08
30	48.13	48.53	48.93	49.34	49.74	50.15	50.56	50.97	51.39	51.80
31	49.73	50.15	50.56	50.98	51.40	51.82	52.25	52.67	53.10	53.53

Cylinders in Ale-Gallons.

	.25	.1	.2	.3	.4	.5	.6	.7	.8	.9
,1	0.17	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.19
,2	0.35	0.35	0.36	0.36	0.36	0.36	0.36	0.37	0.37	0.37
,3	0.52	0.53	0.53	0.53	0.54	0.54	0.55	0.55	0.56	0.56
,4	0.70	0.70	0.71	0.71	0.72	0.72	0.73	0.73	0.74	0.75
,5	0.87	0.88	0.88	0.89	0.90	0.91	0.91	0.92	0.93	0.93
,6	1.04	1.05	1.06	1.07	1.08	1.09	1.09	1.10	1.11	1.12
,7	1.22	1.23	1.24	1.25	1.26	1.27	1.28	1.29	1.30	1.31
,8	1.39	1.40	1.41	1.43	1.44	1.45	1.46	1.46	1.48	1.49
,9	1.57	1.58	1.59	1.60	1.62	1.63	1.64	1.65	1.67	1.68
Area	1.74	1.75	1.77	1.78	1.80	1.81	1.82	1.84	1.85	1.87
2	3.48	3.51	3.54	3.57	3.59	3.62	3.65	3.68	3.71	3.74
3	5.22	5.26	5.31	5.35	5.39	5.43	5.48	5.52	5.56	5.60
4	6.96	7.02	7.07	7.13	7.19	7.24	7.30	7.36	7.41	7.47
5	8.70	8.77	8.84	8.91	8.98	9.05	9.13	9.20	9.27	9.34
6	10.44	10.53	10.61	10.70	10.78	10.87	10.95	11.04	11.12	11.21
7	12.18	12.28	12.38	12.48	12.58	12.68	12.78	12.88	12.98	13.08
8	13.93	14.04	14.15	14.26	14.37	14.49	14.60	14.72	14.83	14.95
9	15.67	15.79	15.92	16.04	16.17	16.30	16.43	16.56	16.68	16.81
10	17.41	17.55	17.69	17.83	17.97	18.11	18.25	18.39	18.54	18.68
11	19.15	19.30	19.45	19.61	19.76	19.92	20.08	20.23	20.39	20.55
12	20.89	21.05	21.22	21.39	21.56	21.73	21.90	22.07	22.25	22.42
13	22.63	22.81	22.95	23.17	23.36	23.54	23.73	23.91	24.10	24.29
14	24.37	24.56	24.76	24.96	25.15	25.35	25.55	25.75	25.95	26.15
15	26.11	26.32	26.53	26.74	26.95	27.16	27.38	27.59	27.81	28.02
16	27.85	28.07	28.30	28.52	28.75	28.98	29.20	29.42	29.66	29.89
17	29.59	29.83	30.07	30.31	30.55	30.79	31.03	31.27	31.51	31.76
18	31.33	31.58	31.84	32.19	32.34	32.60	32.85	33.11	33.37	33.63
19	33.07	33.34	33.60	33.87	34.14	34.41	34.68	34.95	35.22	35.50
20	34.81	35.09	35.37	35.65	35.94	36.22	36.50	36.79	37.08	37.36
21	36.55	36.85	37.14	37.44	37.73	38.03	38.33	38.63	38.93	39.23
22	38.30	38.60	38.91	39.22	39.53	39.84	40.15	40.47	40.78	41.10
23	40.04	40.36	40.68	41.00	41.33	41.65	41.98	42.31	42.64	42.97
24	41.78	42.11	42.45	42.78	43.12	43.46	43.80	44.15	44.49	44.84
25	43.52	43.87	44.21	44.57	44.92	45.27	45.63	45.99	46.34	46.70
26	45.26	45.62	45.98	46.35	46.72	47.09	47.45	47.83	48.20	48.57
27	47.00	47.38	47.75	48.13	48.51	48.90	49.28	49.67	50.05	50.44
28	48.74	49.13	49.52	49.92	50.31	50.71	51.11	51.51	51.91	52.31
29	50.48	50.88	51.29	51.70	52.11	52.52	52.93	53.35	53.76	54.18
30	52.22	52.64	53.06	53.48	53.90	54.33	54.76	55.19	55.61	56.05
31	53.96	54.39	54.83	55.26	55.70	56.14	56.58	57.03	57.47	57.92

Cylinders in Ale-Gallons.

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.19	0.19	0.19	0.19	0.19	0.20	0.20	0.2	0.20	0.20
.2	0.38	0.38	0.38	0.38	0.39	0.39	0.39	0.40	0.40	0.40
.3	0.56	0.57	0.57	0.58	0.58	0.59	0.59	0.60	0.60	0.60
.4	0.75	0.76	0.76	0.77	0.78	0.78	0.79	0.79	0.80	0.81
.5	0.94	0.95	0.96	0.96	0.97	0.98	0.98	0.99	1.00	1.01
.6	1.13	1.14	1.15	1.16	1.16	1.17	1.18	1.19	1.20	1.21
.7	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	1.40	1.41
.8	1.51	1.52	1.53	1.54	1.56	1.56	1.58	1.59	1.60	1.61
.9	1.61	1.71	1.72	1.73	1.75	1.76	1.77	1.79	1.80	1.81
Area	1.88	1.90	1.91	1.93	1.94	1.96	1.97	1.99	2.00	2.01
2	3.77	3.79	3.82	3.85	3.88	3.91	3.94	3.97	4.00	4.03
3	5.65	5.69	5.74	5.78	5.82	5.87	5.91	5.96	6.00	6.05
4	7.53	7.59	7.65	7.71	7.76	7.82	7.88	7.94	8.00	8.06
5	9.41	9.49	9.56	9.63	9.71	9.78	9.85	9.93	10.00	10.08
6	11.30	11.38	11.47	11.56	11.65	11.73	11.82	11.91	12.00	12.09
7	13.18	13.28	13.38	13.48	13.59	13.69	13.79	13.90	14.00	14.11
8	15.06	15.18	15.29	15.41	15.53	15.65	15.76	15.88	16.00	16.12
9	16.94	17.07	17.21	17.34	17.47	17.60	17.74	17.87	18.00	18.14
10	18.83	18.97	19.12	19.26	19.41	19.56	19.71	19.85	20.00	20.15
11	20.71	20.87	21.03	21.19	21.35	21.51	21.68	21.84	22.00	22.17
12	22.59	22.77	22.94	23.12	23.29	23.47	23.65	23.82	24.00	24.18
13	24.47	24.66	24.85	25.04	25.23	25.43	25.62	25.81	26.00	26.20
14	26.36	26.56	26.76	26.97	27.18	27.38	27.59	27.80	28.01	28.21
15	28.24	28.46	28.68	28.90	29.12	29.34	29.56	29.78	30.01	30.23
16	30.12	30.35	30.59	30.82	31.06	31.29	31.53	31.77	32.01	32.24
17	32.01	32.25	32.50	32.75	33.00	33.25	33.50	33.75	34.01	34.26
18	33.89	34.15	34.41	34.67	34.94	35.20	35.47	35.74	36.01	36.28
19	35.77	36.05	36.32	36.60	36.88	37.16	37.44	37.72	38.01	38.29
20	37.65	37.94	38.24	38.53	38.82	39.12	39.41	39.71	40.01	40.31
21	39.54	39.84	40.15	40.45	40.76	41.07	41.38	41.69	42.01	42.32
22	41.42	41.74	42.06	42.38	42.70	43.03	43.35	43.68	44.01	44.34
23	43.30	43.64	43.97	44.31	44.64	44.98	45.32	45.66	46.01	46.35
24	45.18	45.53	45.88	46.23	46.59	46.94	47.29	47.65	48.01	48.37
25	47.07	47.43	47.79	48.16	48.53	48.89	49.26	49.63	50.01	50.38
26	48.95	49.33	49.71	50.09	50.47	50.85	51.24	51.62	52.01	52.40
27	50.83	51.22	51.62	52.01	52.41	52.81	53.21	53.61	54.01	54.41
28	52.72	53.12	53.53	53.94	54.35	54.76	55.18	55.59	56.01	56.43
29	54.60	55.02	55.44	55.87	56.29	56.72	57.15	57.58	58.01	58.44
30	56.48	56.92	57.35	57.79	58.23	58.67	59.12	59.56	60.01	60.46
31	58.36	58.81	59.27	59.72	60.17	60.63	61.09	61.55	62.01	62.47

	27	,1	,2	,3	4	5	6	7	8	,9
,01	0,20	0,20	0,21	0,21	0,21	0,21	0,21	0,22	0,22	0,22
,02	0,41	0,41	0,41	0,41	0,42	0,42	0,42	0,43	0,43	0,43
,03	0,61	0,61	0,62	0,62	0,63	0,63	0,64	0,64	0,65	0,65
,04	0,81	0,82	0,82	0,83	0,84	0,84	0,85	0,85	0,86	0,87
,05	1,01	1,02	1,03	1,04	1,05	1,05	1,06	1,07	1,08	1,08
,06	1,22	1,23	1,24	1,25	1,25	1,26	1,27	1,28	1,29	1,30
,07	1,42	1,43	1,44	1,45	1,46	1,47	1,48	1,49	1,50	1,52
,08	1,62	1,64	1,65	1,66	1,67	1,68	1,70	1,71	1,72	1,73
,09	1,83	1,84	1,85	1,87	1,88	1,90	1,91	1,92	1,94	1,95
Area	2,03	2,05	2,06	2,08	2,09	2,11	2,12	2,14	2,15	2,17
2	4,06	4,09	4,12	4,15	4,18	4,21	4,24	4,27	4,30	4,34
3	6,09	6,14	6,18	6,23	6,27	6,32	6,36	6,41	6,46	6,50
4	8,12	8,18	8,24	8,30	8,36	8,42	8,49	8,55	8,61	8,67
5	10,15	10,23	10,30	10,38	10,45	10,53	10,61	10,68	10,76	10,84
6	12,18	12,27	12,36	12,45	12,55	12,64	12,73	12,82	12,91	13,01
7	14,21	14,32	14,42	14,53	14,64	14,74	14,85	14,96	15,07	15,17
8	16,24	16,36	16,48	16,61	16,73	16,85	16,97	17,10	17,22	17,34
9	18,27	18,41	18,54	18,68	18,82	18,96	19,09	19,23	19,37	19,51
10	20,30	20,45	20,60	20,76	20,91	21,06	21,22	21,37	21,52	21,68
11	22,33	22,50	22,67	22,83	23,00	23,17	23,34	23,51	23,68	23,85
12	24,36	24,54	24,73	24,91	25,09	25,27	25,46	25,64	25,83	26,01
13	26,39	26,59	26,79	26,98	27,18	27,38	27,58	27,78	27,98	28,18
14	28,42	28,64	28,85	29,06	29,27	29,49	29,70	29,92	30,13	30,35
15	30,45	30,68	30,91	31,14	31,36	31,59	31,82	32,05	32,29	32,52
16	32,48	32,73	32,97	33,21	33,45	33,70	33,95	34,19	34,44	34,69
17	34,51	34,77	35,03	35,29	35,55	35,81	36,07	36,33	36,59	36,85
18	36,55	36,82	37,09	37,36	37,64	37,91	38,19	38,47	38,74	39,02
19	38,58	38,86	39,15	39,44	39,73	40,02	40,32	40,60	40,90	41,19
20	40,61	40,91	41,21	41,51	41,82	42,12	42,43	42,74	43,05	43,36
21	42,64	42,95	43,27	43,59	43,91	44,23	44,55	44,88	45,20	45,53
22	44,67	45,00	45,33	45,67	46,00	46,34	46,67	47,01	47,36	47,69
23	46,70	47,04	47,39	47,74	48,09	48,44	48,80	49,15	49,50	49,86
24	48,73	49,08	49,45	49,82	50,18	50,55	50,92	51,29	51,66	52,03
25	50,76	51,13	51,51	51,89	52,27	52,66	53,04	53,42	53,81	54,20
26	52,79	53,18	53,57	53,97	54,36	54,76	55,16	55,56	55,96	56,37
27	54,82	55,23	55,63	56,04	56,45	56,87	57,28	57,70	58,11	58,53
28	56,85	57,27	57,69	58,12	58,54	58,97	59,40	59,84	60,27	60,70
29	58,88	59,32	59,76	60,19	60,64	61,08	61,53	61,97	62,42	62,87
30	60,91	61,36	61,81	62,27	62,73	63,19	63,65	64,11	64,57	65,04
31	62,94	63,41	63,88	64,35	64,82	65,29	65,77	66,25	66,72	67,20

	28	1	2	3	4	5	6	7	8	9
.1	0.22	0.22	0.22	0.22	0.22	0.23	0.23	0.23	0.23	0.23
.2	0.44	0.44	0.44	0.45	0.45	0.45	0.46	0.46	0.46	0.46
.3	0.65	0.66	0.66	0.67	0.67	0.68	0.68	0.69	0.69	0.70
.4	0.87	0.88	0.88	0.89	0.90	0.90	0.91	0.92	0.92	0.93
.5	1.09	1.10	1.11	1.11	1.12	1.13	1.14	1.15	1.15	1.16
.6	1.31	1.32	1.33	1.34	1.35	1.36	1.37	1.38	1.39	1.40
.7	1.53	1.54	1.55	1.56	1.57	1.58	1.59	1.61	1.62	1.63
.8	1.75	1.76	1.77	1.78	1.80	1.81	1.82	1.83	1.85	1.86
.9	1.96	1.98	1.99	2.01	2.02	2.04	2.05	2.06	2.08	2.09
Area	2.18	2.20	2.21	2.23	2.25	2.26	2.28	2.29	2.31	2.32
2	4.37	4.40	4.43	4.46	4.49	4.52	4.56	4.59	4.62	4.65
3	6.55	6.60	6.64	6.69	6.74	6.79	6.83	6.88	6.93	6.98
4	8.73	8.80	8.86	8.92	8.98	9.05	9.11	9.18	9.24	9.30
5	10.92	11.00	11.07	11.15	11.23	11.31	11.39	11.47	11.55	11.63
6	13.10	13.19	13.29	13.38	13.48	13.57	13.67	13.76	13.86	13.96
7	15.28	15.39	15.50	15.61	15.72	15.83	15.95	16.06	16.17	16.28
8	17.47	17.59	17.72	17.84	17.97	18.14	18.22	18.35	18.48	18.61
9	19.65	19.79	19.93	20.07	20.22	20.36	20.50	20.65	20.79	20.93
10	21.83	21.99	22.15	22.31	22.46	22.62	22.78	22.94	23.10	23.26
11	24.02	24.19	24.36	24.54	24.71	24.88	25.06	25.23	25.41	25.59
12	26.20	26.39	26.58	26.77	26.96	27.15	27.34	27.53	27.72	27.91
13	28.38	28.59	28.79	29.00	29.20	29.41	29.61	29.82	30.03	30.24
14	30.57	30.79	31.01	31.23	31.45	31.69	31.89	32.12	32.34	32.57
15	32.75	32.99	33.22	33.46	33.69	33.93	34.17	34.41	34.65	34.89
16	34.94	35.18	35.44	35.69	35.94	36.19	36.45	36.71	36.96	37.22
17	37.12	37.38	37.65	37.92	38.19	38.46	38.73	39.00	39.27	39.54
18	39.30	39.58	39.87	40.15	40.43	40.72	41.01	41.29	41.58	41.87
19	41.49	41.78	42.08	42.38	42.68	42.98	43.28	43.59	43.89	44.20
20	43.67	43.98	44.30	44.61	44.93	45.24	45.56	45.88	46.20	46.52
21	45.85	46.18	46.51	46.84	47.17	47.51	47.84	48.18	48.51	48.85
22	48.04	48.38	48.73	49.07	49.42	49.77	50.12	50.47	50.82	51.17
23	50.22	50.58	50.94	51.30	51.66	52.03	52.40	52.76	53.13	53.50
24	52.40	52.78	53.15	53.53	53.91	54.29	54.67	55.06	55.44	55.83
25	54.59	54.98	55.37	55.76	56.16	56.55	56.95	57.35	57.75	58.15
26	56.77	57.18	57.58	58.00	58.40	58.81	59.23	59.65	60.06	60.48
27	58.95	59.38	59.80	60.23	60.65	61.08	61.51	61.94	62.36	62.80
28	61.14	61.57	62.01	62.46	62.90	63.34	63.79	64.24	64.68	65.13
29	63.32	63.77	64.23	64.69	65.14	65.60	66.06	66.53	66.99	67.46
30	65.50	65.97	66.44	66.92	67.39	67.87	68.34	68.82	69.30	69.78
31	67.69	68.17	68.66	69.15	69.64	70.13	70.62	71.12	71.61	72.11

	29	.1	.2	.3	4	.5	.6	.7	.8	.9
.1	0.23	0.24	0.24	0.24	0.24	0.24	0.24	0.25	0.25	0.25
.2	0.47	0.47	0.47	0.48	0.48	0.48	0.49	0.49	0.49	0.50
.3	0.70	0.71	0.71	0.72	0.72	0.73	0.73	0.75	0.74	0.75
.4	0.94	0.94	0.95	0.96	0.96	0.97	0.98	0.98	0.99	1.00
.5	1.17	1.18	1.19	1.19	1.20	1.21	1.22	1.23	1.24	1.24
.6	1.40	1.41	1.42	1.43	1.44	1.45	1.46	1.47	1.48	1.49
.7	1.64	1.65	1.66	1.67	1.68	1.70	1.71	1.72	1.73	1.74
.8	1.87	1.89	1.90	1.91	1.93	1.94	1.95	1.96	1.98	1.99
.9	2.11	2.12	2.14	2.15	2.17	2.18	2.20	2.21	2.23	2.24
Area	2.34	2.36	2.37	2.39	2.41	2.42	2.44	2.46	2.47	2.49
2	4.68	4.72	4.75	4.78	4.81	4.85	4.88	4.91	4.95	4.98
3	7.03	7.07	7.12	7.17	7.22	7.27	7.32	7.37	7.42	7.47
4	9.37	9.43	9.50	9.56	9.63	9.69	9.76	9.83	9.89	9.96
5	11.71	11.79	11.87	11.95	12.04	12.12	12.20	12.28	12.37	12.45
6	14.05	14.15	14.25	14.35	14.44	14.54	14.64	14.74	14.84	14.94
7	16.40	16.51	16.62	16.74	16.85	16.97	17.08	17.20	17.31	17.43
8	18.74	18.87	19.00	19.13	19.26	19.39	19.52	19.65	19.79	19.92
9	21.08	21.23	21.37	21.52	21.67	21.81	21.96	22.11	22.26	22.41
10	23.42	23.58	23.75	23.91	24.07	24.24	24.40	24.57	24.73	24.90
11	25.76	25.94	26.12	26.30	26.48	26.66	26.84	27.02	27.21	27.39
12	28.11	28.30	28.50	28.69	28.89	29.08	29.28	29.48	29.68	29.88
13	30.45	30.66	30.87	31.08	31.29	31.51	31.72	31.94	32.15	32.37
14	32.79	33.02	33.25	33.47	33.70	33.93	34.16	34.39	34.63	34.86
15	35.13	35.38	35.62	35.86	36.11	36.36	36.60	36.85	37.10	37.35
16	37.48	37.73	37.99	38.26	38.52	38.78	39.04	39.31	39.57	39.84
17	39.82	40.09	40.37	40.63	40.92	41.20	41.48	41.76	42.05	42.33
18	42.16	42.45	42.74	43.04	43.33	43.63	43.92	44.22	44.52	44.82
19	44.50	44.81	45.12	45.43	45.74	46.05	46.36	46.68	46.99	47.31
20	46.85	47.17	47.49	47.82	48.15	48.47	48.80	49.13	49.47	49.80
21	49.19	49.53	49.87	50.21	50.55	50.90	51.24	51.59	51.94	52.29
22	51.53	51.88	52.24	52.60	52.96	53.32	53.68	54.05	54.41	54.78
23	53.87	54.24	54.62	54.99	55.37	55.74	56.12	56.50	56.89	57.27
24	56.21	56.60	56.99	57.38	57.77	58.17	58.56	58.96	59.36	59.76
25	58.56	58.96	59.37	59.77	60.18	60.59	61.00	61.42	61.82	62.25
26	60.90	61.32	61.74	62.17	62.59	63.02	63.44	63.87	64.31	64.74
27	63.24	63.68	64.12	64.57	65.00	65.44	65.88	66.33	66.78	67.23
28	65.58	66.03	66.49	66.95	67.40	67.86	68.33	68.79	69.25	69.72
29	67.93	68.39	68.87	69.34	69.81	70.29	70.77	71.24	71.73	72.21
30	70.27	70.75	71.24	71.73	72.23	72.71	73.21	73.70	74.20	74.70
31	72.61	73.11	73.62	74.12	74.63	75.13	75.65	76.16	76.67	77.19

	.30	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.25	0.25	0.25	0.26	0.26	0.26	0.26	0.26	0.26	0.27
.2	0.50	0.50	0.51	0.51	0.51	0.52	0.52	0.52	0.53	0.53
.3	0.75	0.76	0.76	0.77	0.77	0.78	0.78	0.79	0.79	0.80
.4	1.00	1.01	1.02	1.02	1.08	1.04	1.04	1.05	1.06	1.06
.5	1.26	1.26	1.27	1.28	1.29	1.29	1.30	1.31	1.32	1.33
.6	1.50	1.51	1.52	1.53	1.54	1.55	1.56	1.57	1.58	1.60
.7	1.75	1.77	1.78	1.79	1.80	1.81	1.82	1.84	1.85	1.86
.8	2.00	2.02	2.03	2.05	2.06	2.07	2.09	2.10	2.11	2.13
.9	2.26	2.27	2.29	2.30	2.32	2.33	2.35	2.36	2.38	2.39
Area	2.51	2.52	2.54	2.56	2.57	2.59	2.61	2.62	2.64	2.66
2	5.01	5.05	5.08	5.11	5.15	5.18	5.23	5.25	5.28	5.32
3	7.52	7.57	7.62	7.67	7.72	7.77	7.82	7.87	7.93	7.98
4	10.03	10.09	10.16	10.23	10.30	10.36	10.43	10.50	10.57	10.64
5	12.53	12.62	12.70	12.78	12.87	12.95	13.04	13.12	13.21	13.30
6	15.04	15.14	15.24	15.34	15.44	15.54	15.65	15.75	15.85	15.95
7	17.55	17.66	17.78	17.90	18.02	18.14	18.25	18.37	18.49	18.61
8	20.05	20.19	20.32	20.46	20.59	20.73	20.86	21.00	21.14	21.27
9	22.56	22.71	22.86	23.01	23.16	23.32	23.47	23.62	23.78	23.93
10	25.07	25.23	25.40	25.57	25.74	25.91	26.08	26.25	26.42	26.59
11	27.57	27.76	27.94	28.13	28.31	28.50	28.69	28.87	29.06	29.25
12	30.08	30.28	30.48	30.38	30.89	31.09	31.29	31.50	31.70	31.91
13	32.59	32.80	33.07	33.24	33.46	33.68	33.90	34.12	34.35	34.57
14	35.09	35.33	35.56	35.80	36.03	36.27	36.51	36.75	36.99	39.23
15	37.60	37.85	38.10	38.35	38.61	38.86	39.12	39.37	39.63	39.89
16	40.11	40.37	40.64	40.91	41.18	41.45	41.72	42.00	42.27	42.55
17	42.61	42.90	43.18	43.47	43.76	44.04	44.33	44.62	44.91	45.21
18	45.12	45.42	45.72	46.03	46.33	46.63	46.94	47.25	47.56	47.87
19	47.62	47.94	48.26	48.58	48.90	49.22	49.55	49.87	50.20	50.52
20	50.13	50.47	50.80	51.14	51.48	51.82	52.16	52.50	52.84	53.18
21	52.64	52.99	53.34	53.70	54.05	54.41	54.76	55.12	55.48	55.84
22	55.14	55.51	55.88	56.25	56.63	57.00	57.37	57.75	58.12	58.50
23	57.65	58.04	58.42	58.81	59.20	59.59	59.98	60.37	60.77	61.16
24	60.16	60.56	60.96	61.37	61.77	62.18	62.59	63.00	63.41	63.82
25	62.66	63.08	63.50	63.92	64.35	64.77	65.19	65.62	66.05	66.48
26	65.17	65.61	66.04	66.48	66.92	67.36	67.80	68.25	69.69	69.14
27	67.68	68.13	68.58	69.04	69.49	69.95	70.41	70.87	71.33	71.80
28	70.18	70.65	71.12	71.60	72.07	72.54	73.02	78.50	73.98	74.46
29	72.69	73.18	73.66	74.15	74.64	75.13	75.63	76.12	76.62	77.12
30	75.20	75.70	76.20	76.71	77.22	77.72	78.23	78.75	79.26	79.78
31	77.70	78.22	78.74	79.27	79.79	80.31	80.84	81.37	81.90	82.43

Cylinders in Ale-Gallons.

	31	.1	.2	.3	.4	5.	.6	7.	8.	.9
.1	0.27	0.27	0.27	0.27	0.27	0.28	0.28	0.28	0.28	0.28
.2	0.53	0.54	0.54	0.55	0.55	0.55	0.56	0.56	0.56	0.57
.3	0.80	0.81	0.81	0.82	0.82	0.83	0.83	0.84	0.84	0.85
.4	1.07	1.08	1.08	1.05	1.10	1.10	1.11	1.12	1.13	1.13
.5	1.34	1.35	1.36	1.36	1.37	1.38	1.39	1.40	1.41	1.42
.6	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69	1.70
.7	1.87	1.89	1.90	1.91	1.92	1.93	1.95	1.96	1.97	1.98
.8	2.14	2.15	2.17	2.18	1.20	2.21	2.22	2.24	2.25	2.27
.9	2.41	2.42	2.44	2.46	2.47	2.49	2.50	2.52	2.53	2.55
Area	2.68	2.69	2.71	2.73	2.75	2.76	2.78	2.80	2.82	2.83
2	5.35	5.39	5.42	5.46	5.49	5.53	5.56	5.60	5.63	5.67
3	8.03	8.08	8.13	8.19	8.24	8.29	8.34	8.40	8.45	8.50
4	10.71	10.77	10.84	10.91	10.98	11.05	11.12	11.19	11.27	11.34
5	13.38	13.47	13.56	13.64	13.73	13.82	13.90	13.99	14.08	14.17
6	16.06	16.16	16.27	16.37	16.48	16.58	16.69	16.79	16.90	17.00
7	18.73	18.86	18.98	19.10	19.22	19.34	19.47	19.59	19.71	19.84
8	21.41	21.51	21.69	21.83	21.97	22.11	22.25	22.39	22.53	22.67
9	24.09	24.24	24.40	24.56	24.71	24.87	25.03	25.19	25.35	25.51
10	26.76	26.94	27.11	27.28	27.46	27.63	27.81	27.95	28.16	28.34
11	29.44	29.63	20.82	30.01	30.21	30.40	30.59	30.79	30.98	31.17
12	32.12	32.32	32.53	32.74	32.95	33.16	33.37	33.58	33.80	34.01
13	34.79	35.02	35.24	35.47	35.70	35.93	36.15	36.38	36.61	36.84
14	37.47	37.71	37.95	38.20	38.44	38.69	38.93	39.18	39.43	39.68
15	40.15	40.41	40.67	40.93	41.19	41.45	41.72	41.98	42.25	42.51
16	42.82	43.10	43.38	43.66	43.94	44.22	44.50	44.78	45.06	45.35
17	45.50	45.75	46.09	46.38	46.68	46.98	47.28	47.58	47.88	48.18
18	48.18	48.45	48.80	49.11	49.43	49.74	50.06	50.38	50.69	51.01
19	50.85	51.18	51.51	51.84	52.17	52.51	52.84	53.17	53.51	53.85
20	53.53	53.87	54.22	54.57	54.92	55.27	55.62	55.97	56.33	56.68
21	56.21	56.57	56.93	57.30	57.67	58.03	58.40	58.77	59.14	59.52
22	58.88	59.26	59.64	60.03	60.41	60.80	61.18	61.57	61.96	62.35
23	61.56	61.95	62.35	62.76	63.16	63.56	63.96	64.37	64.78	65.18
24	64.24	64.65	65.07	65.48	65.90	66.32	66.75	67.17	67.59	68.02
25	66.91	67.34	67.78	68.21	68.65	59.09	69.53	69.97	70.41	70.85
26	69.59	70.04	70.49	70.94	71.40	71.85	72.31	72.77	73.23	73.69
27	72.26	72.73	73.20	73.67	74.14	74.61	75.09	75.56	76.04	76.52
28	74.94	75.42	75.91	76.40	76.89	77.38	77.87	78.36	78.86	79.35
29	77.62	78.12	78.62	79.13	79.63	80.14	80.65	81.16	81.68	82.19
30	80.29	80.81	81.33	81.85	82.38	82.90	83.43	83.96	84.49	85.02
31	82.97	83.50	84.04	84.58	85.13	85.67	86.21	86.76	87.31	87.86

	32	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.28	0.29	0.29	0.29	0.29	0.29	0.30	0.30	0.30	0.30
.2	0.57	0.57	0.58	0.58	0.58	0.59	0.59	0.60	0.60	0.60
.3	0.86	0.86	0.87	0.87	0.88	0.88	0.89	0.89	0.90	0.90
.4	1.14	1.15	1.15	1.16	1.17	1.18	1.18	1.19	1.20	1.20
.5	1.43	1.43	1.44	1.45	1.46	1.47	1.48	1.49	1.50	1.51
.6	1.71	1.72	1.73	1.74	1.75	1.76	1.78	1.79	1.80	1.81
.7	2.00	2.01	2.02	2.03	2.05	2.06	2.07	2.08	2.10	2.11
.8	2.28	2.30	2.31	2.32	2.34	2.35	2.37	2.38	2.40	2.41
.9	2.57	2.58	2.60	2.61	2.63	2.65	2.66	2.68	2.70	2.71
Area	2.85	2.87	2.89	2.91	2.92	2.94	2.95	2.98	3.00	3.01
2	5.70	5.74	5.77	5.81	5.85	5.88	5.92	5.96	5.99	6.03
3	8.56	8.61	8.66	8.72	8.77	8.82	8.88	8.93	8.99	9.04
4	11.41	11.48	11.55	11.62	11.69	11.77	11.84	11.91	11.98	12.06
5	14.26	14.35	14.44	14.53	14.62	14.71	14.80	14.89	14.98	15.07
6	17.11	17.22	17.33	17.43	17.54	17.65	17.76	17.87	17.98	18.09
7	19.96	20.09	20.21	20.34	20.47	20.59	20.72	20.85	20.97	21.10
8	22.81	22.95	23.10	23.25	23.39	23.53	23.68	23.82	23.97	24.12
9	25.67	25.83	25.99	26.15	26.31	26.48	26.64	26.80	26.97	27.13
10	28.52	28.70	28.88	29.06	29.24	29.42	29.60	29.78	29.96	30.15
11	31.37	31.57	31.77	31.96	32.16	32.36	32.56	32.76	32.96	33.16
12	34.22	34.44	34.65	34.87	35.08	35.30	35.52	35.74	35.96	36.17
13	37.07	37.31	37.54	37.77	38.01	38.24	38.48	38.71	38.95	39.19
14	39.93	40.18	40.43	40.68	40.93	41.18	41.44	41.69	41.95	42.20
15	42.78	43.05	43.32	43.58	43.85	44.13	44.40	44.67	44.94	45.22
16	45.63	45.92	46.20	46.49	46.78	47.07	47.36	47.65	47.94	48.23
17	48.48	48.79	49.09	49.40	49.70	50.01	50.32	50.63	50.94	51.25
18	51.33	51.66	51.98	52.30	52.63	52.95	53.28	53.61	53.93	54.26
19	54.19	54.53	54.87	55.21	55.55	55.89	56.24	56.58	56.93	57.28
20	57.04	57.40	57.75	58.11	58.47	58.84	59.20	59.56	59.93	60.29
21	59.89	60.27	60.64	61.02	61.40	61.78	62.16	62.54	62.92	63.31
22	62.74	63.14	63.53	63.92	64.32	64.72	65.12	65.52	65.92	66.32
23	65.59	66.00	66.42	66.83	67.24	67.66	68.08	68.50	68.91	69.34
24	68.45	68.87	69.30	69.74	70.17	70.60	71.04	71.47	71.91	72.35
25	71.30	71.74	72.19	72.64	73.39	73.54	74.00	74.45	74.91	75.36
26	74.15	74.61	75.08	75.55	76.02	76.49	76.96	77.43	77.90	78.38
27	77.00	77.48	77.97	78.45	78.94	79.43	79.92	80.41	80.90	81.39
28	79.85	80.35	80.86	81.36	81.86	82.37	82.88	83.39	83.90	84.41
29	82.70	83.22	83.74	84.26	84.79	85.31	85.84	86.36	86.89	87.42
30	85.56	86.09	86.63	87.17	87.71	88.25	88.80	89.34	89.89	90.44
31	88.41	88.96	89.52	90.08	90.63	91.20	91.76	92.32	92.89	93.45

	.1	.1	.2	.3	.4	.5	.6	.7	.8	.8
.1	0.30	0.30	0.31	0.31	0.31	0.31	0.31	0.32	0.32	0.32
.2	0.61	0.61	0.61	0.62	0.62	0.62	0.63	0.63	0.64	0.64
.3	0.91	0.91	0.92	0.93	0.93	0.94	0.94	0.95	0.95	0.96
.4	1.21	1.22	1.23	1.23	1.24	1.25	1.26	1.26	1.27	1.28
.5	1.52	1.53	1.53	1.54	1.55	1.56	1.57	1.58	1.59	1.60
.6	1.82	1.83	1.84	1.85	1.86	1.87	1.89	1.91	1.91	1.92
.7	2.12	2.14	2.15	2.16	2.17	2.19	2.20	2.23	2.23	2.24
.8	2.43	2.44	2.46	2.47	2.49	2.50	2.51	2.54	2.54	2.56
.9	2.73	2.75	2.76	2.78	2.81	2.81	2.83	2.86	2.86	2.88
Area	3.03	3.05	3.07	3.09	3.11	3.13	3.14	3.16	3.18	3.20
2	6.07	6.10	6.14	6.18	6.21	6.25	6.29	6.33	6.36	6.40
3	9.10	9.15	9.21	9.26	9.32	9.38	9.43	9.49	9.54	9.60
4	12.13	12.21	12.28	12.35	12.43	12.50	12.58	12.65	12.73	12.80
5	15.16	15.26	15.35	15.44	15.53	15.63	15.72	15.81	15.91	16.00
6	18.20	18.31	18.42	18.53	18.64	18.75	18.87	18.98	19.09	19.20
7	21.23	21.36	21.49	21.62	21.75	21.88	22.04	22.14	22.27	22.40
8	24.26	24.41	24.56	24.71	24.85	25.00	25.15	25.30	25.45	25.61
9	27.30	27.46	27.63	27.80	27.96	28.13	28.30	28.47	28.64	28.81
10	30.33	30.51	30.70	30.88	31.07	31.26	31.44	31.63	31.82	32.01
11	33.36	33.56	33.77	33.97	34.18	34.38	34.59	34.79	35.00	35.21
12	36.40	36.62	36.84	37.06	37.28	37.51	37.73	37.96	38.18	38.41
13	39.43	39.67	39.91	40.15	40.39	40.63	40.88	41.12	41.36	41.61
14	42.46	42.72	42.98	43.24	43.50	43.76	44.02	44.28	44.54	44.81
15	45.49	45.77	46.05	46.33	46.60	46.88	47.16	47.44	47.73	48.01
16	48.53	48.82	49.12	49.41	49.71	50.01	50.33	50.61	50.91	51.21
17	51.56	51.87	52.19	52.50	52.82	53.13	53.45	53.77	54.09	54.41
18	54.59	54.92	55.26	55.59	55.92	56.26	56.60	56.93	57.27	57.61
19	57.63	57.98	58.33	58.68	59.03	59.39	59.74	60.10	60.45	60.81
20	60.66	61.03	61.40	61.77	62.14	62.51	62.89	63.26	63.64	64.01
21	63.69	64.08	64.47	64.86	65.24	65.64	66.03	66.43	66.82	67.21
22	66.73	67.13	67.54	67.94	68.35	68.76	69.17	69.59	70.00	70.41
23	69.76	70.18	70.60	71.03	71.46	71.85	72.32	72.75	73.18	73.62
24	72.79	73.23	73.67	74.11	74.57	75.01	75.46	75.91	76.36	76.82
25	75.82	76.28	76.74	77.21	77.67	78.14	78.61	79.08	79.54	80.02
26	78.86	79.34	78.81	80.3	80.78	81.27	81.75	82.24	82.73	83.22
27	81.89	82.39	82.88	83.39	83.89	84.39	84.90	85.40	85.91	86.42
28	84.92	85.44	85.95	86.47	86.99	87.52	88.04	88.57	89.09	89.62
29	87.96	88.49	89.02	89.56	90.10	90.64	91.18	91.73	92.27	92.82
30	90.99	91.54	92.09	92.64	93.21	93.77	94.33	94.89	95.45	96.02
31	94.02	94.59	95.16	95.74	96.31	96.89	97.47	98.05	98.64	99.22

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.32	0.32	0.33	0.33	0.33	0.33	0.33	0.33	0.34	0.34
.2	0.64	0.65	0.65	0.65	0.66	0.66	0.67	0.67	0.67	0.68
.3	0.97	0.97	0.98	0.98	0.99	0.99	1.00	1.01	1.01	1.02
.4	1.29	1.29	1.30	1.31	1.32	1.33	1.33	1.34	1.35	1.36
.5	1.61	1.62	1.63	1.64	1.65	1.66	1.67	1.68	1.69	1.70
.6	1.93	1.94	1.95	1.97	1.98	1.99	2.00	2.01	2.02	2.03
.7	2.25	2.27	2.28	2.29	2.31	2.32	2.33	2.35	2.36	2.37
.8	2.58	2.59	2.61	2.62	2.64	2.65	2.67	2.68	2.70	2.71
.9	2.90	2.91	2.93	2.95	2.97	2.98	3.00	3.02	3.04	3.05
Area	3.22	3.24	3.26	3.28	3.30	3.31	3.33	3.35	3.37	3.39
2	6.44	6.48	6.51	6.55	6.59	6.63	6.67	6.71	6.75	6.78
3	9.66	9.72	9.77	9.83	9.89	9.94	10.00	10.06	10.12	10.18
4	12.88	12.95	13.03	13.11	13.18	13.26	13.34	13.41	13.49	13.57
5	16.10	16.19	16.29	16.38	16.48	16.57	16.67	16.77	16.86	16.96
6	19.32	19.43	19.55	19.66	19.77	19.89	20.00	20.12	20.24	20.35
7	22.54	22.67	22.80	22.94	23.07	23.20	23.34	23.47	23.61	23.75
8	25.76	25.91	26.06	26.21	26.37	26.52	26.67	26.83	26.98	27.14
9	28.98	29.15	29.32	29.49	29.66	29.83	30.01	30.18	30.36	30.53
10	32.20	32.38	32.58	32.77	32.96	33.15	33.34	33.58	33.73	33.92
11	35.42	35.62	35.83	36.04	36.25	36.46	36.68	36.89	37.10	37.31
12	38.63	38.86	39.09	39.32	39.55	39.78	40.04	40.24	40.49	40.71
13	41.85	42.10	42.35	42.60	42.84	43.09	43.34	43.60	43.85	44.10
14	45.07	45.34	45.61	45.87	46.14	46.41	46.68	46.95	47.22	47.49
15	48.29	48.58	48.86	49.15	49.44	49.72	50.01	50.30	50.59	50.88
16	51.51	51.82	52.12	52.43	52.73	53.04	53.35	53.66	53.97	54.28
17	54.73	55.05	55.38	55.70	56.03	56.35	56.68	57.01	57.34	57.67
18	57.95	58.29	58.64	58.98	59.32	59.67	60.02	60.36	60.71	61.06
19	61.17	61.53	61.89	62.25	62.62	62.98	63.35	63.72	64.08	64.45
20	64.39	64.77	65.15	65.52	65.92	66.30	66.68	67.07	67.46	67.85
21	67.61	68.01	68.41	68.81	69.21	69.61	70.02	70.42	70.83	71.24
22	70.83	71.25	71.67	72.08	72.51	72.93	73.35	73.78	74.20	74.63
23	74.05	74.49	74.92	75.36	75.80	76.24	76.69	77.13	77.58	78.02
24	77.27	77.72	78.18	78.64	79.10	79.56	80.02	80.48	80.95	81.41
25	80.49	80.96	81.44	81.91	82.39	82.87	83.35	83.84	84.32	84.81
26	83.71	84.20	84.70	85.19	85.69	86.19	86.69	87.19	87.69	88.20
27	86.93	87.44	87.95	88.47	88.99	89.50	90.02	90.54	91.07	91.59
28	90.15	90.68	91.21	91.74	92.28	92.82	93.36	93.90	94.44	94.98
29	93.37	93.92	94.47	95.02	95.58	96.13	96.69	97.25	97.81	98.38
30	96.59	97.15	97.73	98.30	98.87	99.45	100.03	100.60	101.19	101.77
31	99.81	100.39	100.99	101.57	102.17	102.76	103.36	103.96	104.56	105.16

Cylinders *in Ale-Gallons.*

	35	1.	.2	.3	4.	.5	.6	.7	.8	.9
.1	0.34	0.34	0.34	0.35	0.35	0.35	0.35	0.35	0.36	0.36
.2	0.68	0.69	0.69	0.69	0.70	0.70	0.71	0.71	0.71	0.72
.3	1.02	1.03	1.03	1.04	1.05	1.05	1.06	1.06	1.07	1.08
.4	1.36	1.37	1.38	1.39	1.40	1.40	1.41	1.42	1.43	1.44
.5	1.71	1.72	1.72	1.73	1.74	1.75	1.76	1.77	1.78	1.79
.6	2.05	2.06	2.07	2.08	2.09	2.11	2.12	2.13	2.14	2.15
.7	2.39	2.40	2.42	2.43	2.44	2.46	2.47	2.48	2.50	2.51
.8	2.73	2.74	2.76	2.78	2.79	2.81	2.82	2.84	2.86	2.87
.9	3.07	3.09	3.11	3.12	3.14	3.16	3.18	3.19	3.21	3.23
Area	3.41	3.43	3.45	3.47	3.49	3.51	3.53	3.55	3.57	3.59
2	6.82	6.86	6.90	6.94	6.98	7.02	7.06	7.10	7.14	7.18
3	10.23	10.29	10.35	10.41	10.47	10.53	10.59	10.65	10.71	10.77
4	13.65	13.72	13.80	13.88	13.96	14.04	14.12	14.20	14.28	14.36
5	17.05	17.16	17.25	17.35	17.45	17.55	17.65	17.75	17.85	17.95
6	20.47	20.59	20.70	20.82	20.94	21.06	21.18	21.30	21.42	21.54
7	23.88	24.02	24.16	24.29	24.43	24.57	24.71	24.85	24.99	25.13
8	27.29	27.45	27.61	27.76	27.92	28.08	28.24	28.40	28.56	28.72
9	30.70	30.88	31.06	31.23	31.41	31.59	31.77	31.95	32.12	32.30
10	34.12	34.31	34.51	34.70	34.90	35.10	35.30	35.50	35.69	35.89
11	37.53	37.74	37.96	38.17	38.39	38.61	38.83	39.05	39.26	39.48
12	40.94	41.18	41.41	41.65	41.88	42.12	42.36	42.59	42.83	43.07
13	44.35	44.61	44.86	45.12	45.37	45.63	45.89	46.14	46.40	46.66
14	47.76	48.04	48.31	48.59	48.86	49.14	49.42	49.69	49.97	50.25
15	51.18	51.47	51.76	52.05	52.35	52.65	52.95	53.24	53.54	53.84
16	54.59	54.90	55.21	55.53	55.84	56.16	56.47	56.79	57.11	57.43
17	58.00	58.33	58.66	59.00	59.33	59.67	60.00	60.34	60.68	61.02
18	61.41	61.76	62.11	62.47	62.82	63.18	63.53	63.89	64.25	64.61
19	64.82	65.20	65.56	65.94	66.31	66.69	67.06	67.44	67.82	68.20
20	68.23	68.63	69.02	69.41	69.80	70.20	70.59	70.99	71.39	71.79
21	71.65	72.06	72.47	72.88	73.29	73.71	74.12	74.54	74.96	75.38
22	75.06	75.49	75.92	76.35	76.78	77.22	77.65	78.09	78.53	78.97
23	78.47	78.92	79.37	79.82	80.27	80.73	81.18	81.64	82.10	82.56
24	81.88	82.35	82.82	83.29	83.76	84.24	84.71	85.19	85.67	86.15
25	85.29	85.78	86.27	86.76	87.25	87.75	88.24	88.74	89.24	89.74
26	88.70	89.21	89.72	90.23	90.74	91.26	91.77	92.29	92.81	93.33
27	92.12	92.64	93.17	93.70	94.23	94.77	95.30	95.84	96.38	96.92
28	95.53	96.08	96.62	9 7.17	97.73	98.28	98.83	99.39	99.95	100.51
29	98.94	99.51	100.05	100.64	101.21	101.79	102.36	102.94	103.51	104.09
30	102.35	102.94	103.52	104.11	104.71	105.30	105.89	106.49	107.08	107.68
31	105.76	106.37	106.97	107.58	108.20	108.81	109.42	110.04	110.65	111.27

	36	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.36	0.36	0.36	.37	0.37	0.37	0.37	0.37	0.38	0.38
.2	0.72	0.73	0.73	.73	0.74	0.74	0.75	0.75	0.75	0.76
.3	1.08	1.09	1.09	1.10	1.11	1.11	1.12	1.13	1.13	1.14
.4	1.44	1.45	1.46	1.47	1.48	1.48	1.49	1.50	1.51	1.52
.5	1.80	1.81	1.82	1.83	1.84	1.85	1.87	1.88	1.89	1.90
.6	2.17	2.18	2.19	2.20	2.21	2.23	2.24	2.25	2.26	2.28
.7	2.53	2.54	2.55	2.57	2.58	2.60	2.61	2.63	2.64	2.65
.8	2.89	2.90	2.92	2.94	2.95	2.97	2.98	3.00	3.02	3.03
.9	3.25	3.27	3.28	3.30	3.32	3.34	3.36	3.38	3.39	3.41
Area	3.61	3.63	3.65	3.67	3.69	3.71	3.73	3.75	3.77	3.79
2	7.22	7.26	7.30	7.34	7.38	7.42	7.46	7.50	7.54	7.58
3	10.83	10.89	10.95	11.01	11.07	11.13	11.19	11.25	11.31	11.38
4	14.44	14.52	14.60	14.68	14.76	14.84	14.92	15.00	15.09	15.17
5	18.05	18.15	18.25	18.35	18.45	18.55	18.65	18.76	18.86	18.96
6	21.66	21.78	21.90	22.02	22.14	22.26	22.38	22.51	22.63	22.75
7	25.27	25.41	25.55	25.69	25.83	25.97	26.12	26.26	26.40	26.55
8	28.88	29.04	29.20	29.36	29.52	29.68	29.85	30.01	30.17	30.34
9	32.49	32.67	32.85	33.03	33.21	33.39	33.58	33.76	33.94	34.13
10	36.09	36.30	36.50	36.70	36.90	37.10	37.31	37.51	37.72	37.92
11	39.70	39.93	40.15	40.37	40.59	40.81	41.04	41.26	41.49	41.71
12	43.31	43.55	43.80	44.04	44.28	44.72	44.77	45.01	45.26	45.51
13	46.92	47.18	47.45	47.71	47.97	48.23	48.50	48.77	49.03	49.30
14	50.53	50.81	51.10	51.38	51.66	51.95	52.23	52.52	52.80	53.09
15	54.14	54.44	54.75	55.05	55.35	55.66	55.96	56.27	56.58	56.88
16	57.75	58.07	58.39	58.72	59.04	59.37	59.69	60.02	60.35	60.67
17	61.36	61.70	62.04	62.39	62.73	63.08	63.42	63.77	64.12	64.47
18	64.97	65.33	65.69	66.06	66.42	66.79	67.15	67.52	67.89	68.26
19	68.58	68.56	69.34	69.73	70.11	70.50	70.88	71.27	71.66	72.05
20	72.19	72.59	72.99	73.40	73.80	74.21	74.62	75.02	75.43	75.84
21	75.80	76.22	76.64	77.07	77.49	77.92	78.35	78.77	79.21	79.64
22	79.41	79.85	80.29	80.74	81.18	81.63	82.08	82.53	82.98	83.43
23	83.02	83.48	83.94	84.41	84.87	85.34	85.81	86.28	86.75	87.22
24	86.63	87.11	87.59	88.08	88.56	89.05	89.54	90.03	90.52	91.01
25	90.24	90.74	91.24	91.75	92.25	92.76	93.27	93.78	94.29	94.80
26	93.85	94.37	94.89	95.42	95.94	96.47	97.00	97.53	98.06	98.60
27	97.46	98.00	98.54	99.09	99.63	100.18	100.73	101.28	101.84	102.39
28	101.07	101.63	102.19	102.76	103.32	103.89	104.46	105.03	105.61	106.18
29	104.68	105.26	105.84	106.43	107.01	107.60	108.19	108.78	109.38	109.97
30	108.28	108.89	109.49	110.10	110.70	111.31	111.92	112.54	113.15	113.77
31	111.89	112.52	113.14	113.77	114.39	115.02	115.65	116.29	116.92	117.56

	0.	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.38	0.38	0.39	0.39	0.39	0.39	0.39	0.40	0.40	.40
.2	0.76	0.77	0.77	0.77	0.78	0.78	0.79	0.79	0.80	.80
.3	1.14	1.15	1.16	1.16	1.17	1.17	1.18	1.19	1.19	1.20
.4	1.52	1.53	1.54	1.55	1.56	1.57	1.57	1.58	1.59	1.60
.5	1.91	1.92	1.93	1.94	1.95	1.96	1.97	1.98	1.99	2.00
.6	2.29	2.30	2.31	2.32	2.34	2.35	2.36	2.37	2.39	2.40
.7	2.67	2.68	2.70	2.71	2.73	2.74	2.75	2.77	2.79	2.80
.8	3.05	3.07	3.08	3.10	3.12	3.13	3.15	3.17	3.18	3.20
.9	3.43	3.45	3.47	3.49	3.51	3.52	3.54	3.56	3.58	3.60
Area	3.81	3.83	3.85	3.87	3.90	3.92	3.94	3.96	3.98	4.00
2	7.63	7.67	7.71	7.75	7.79	7.83	7.87	7.92	7.96	8.00
3	11.44	11.50	11.56	11.62	11.69	11.75	11.81	11.87	11.94	12.00
4	15.25	15.33	15.42	15.50	15.58	15.67	15.75	15.83	15.92	16.00
5	19.06	19.17	19.27	19.37	19.48	19.58	19.69	19.79	19.90	20.00
6	22.88	23.00	23.12	23.25	23.37	23.50	23.62	23.75	23.88	24.00
7	26.69	26.83	26.98	27.12	27.27	27.42	27.56	27.71	27.86	28.00
8	30.50	30.67	30.83	31.00	31.17	31.33	31.50	31.67	31.84	32.00
9	34.31	34.50	34.69	34.87	35.06	35.25	35.44	35.63	35.82	36.00
10	38.13	38.33	38.54	38.75	38.96	39.16	39.37	39.58	39.79	40.00
11	41.94	42.17	42.39	42.62	42.85	43.08	43.31	43.54	43.77	44.01
12	45.75	46.00	46.25	46.50	46.75	47.00	47.25	47.50	47.75	48.01
13	49.57	49.83	50.10	50.37	50.64	50.91	51.19	51.46	51.73	52.01
14	53.38	53.67	53.96	54.25	54.54	54.83	55.12	55.42	55.71	56.01
15	57.19	57.50	57.81	58.12	58.44	58.75	59.06	59.38	59.69	60.01
16	61.00	61.33	61.67	62.00	62.33	62.66	63.00	63.33	63.67	64.01
17	64.82	65.17	65.52	65.87	66.23	66.58	66.94	67.29	67.65	68.01
18	68.63	69.00	69.37	69.75	70.12	70.50	70.87	71.25	71.63	72.01
19	72.44	72.83	73.23	73.62	74.02	74.41	74.81	75.21	75.61	76.01
20	76.26	76.67	77.08	77.50	77.91	78.33	78.75	79.17	79.59	80.01
21	80.07	80.50	80.94	81.37	81.81	82.25	82.69	83.13	83.57	84.01
22	83.88	84.33	84.79	85.25	85.71	86.16	86.62	87.08	87.55	88.01
23	87.69	88.17	88.64	89.12	89.60	90.08	90.56	91.04	91.53	92.01
24	91.51	92.00	92.50	93.00	93.50	94.00	94.50	95.00	95.51	96.01
25	95.32	95.83	96.35	96.87	97.39	97.91	98.44	98.96	99.49	100.01
26	99.13	99.67	100.21	100.75	101.29	101.83	102.37	102.92	103.47	104.01
27	102.93	103.50	104.06	104.62	105.18	105.75	106.31	106.88	107.45	108.01
28	106.76	107.33	107.91	108.50	109.08	109.66	110.25	110.83	111.43	112.01
29	110.57	111.17	111.77	112.37	112.97	113.58	114.19	114.79	115.41	116.01
30	114.38	115.00	115.62	116.25	116.87	117.49	118.12	118.75	119.38	120.01
31	118.20	118.84	119.48	120.12	120.77	121.41	122.06	122.71	123.36	124.02

Cylinders in Ale-Gallons.

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.40	0.40	0.41	0.41	0.41	0.41	0.41	0.42	0.42	0.42
.2	0.80	0.80	0.81	0.82	0.82	0.83	0.83	0.83	0.84	0.84
.3	1.21	1.21	1.22	1.23	1.23	1.24	1.24	1.25	1.26	1.26
.4	1.61	1.62	1.63	1.63	1.64	1.65	1.66	1.67	1.68	1.69
.5	2.01	2.02	2.03	2.04	2.05	2.06	2.07	2.09	2.10	2.11
.6	2.41	2.43	2.44	2.45	2.46	2.48	2.49	2.50	2.52	2.53
.7	2.81	2.83	2.84	2.86	2.87	2.89	2.90	2.92	2.93	2.95
.8	3.22	3.23	3.25	3.27	3.29	3.30	3.32	3.34	3.35	3.37
.9	3.62	3.64	3.66	3.68	3.70	3.72	3.73	3.75	3.77	3.79
Area	4.02	4.04	4.06	4.09	4.11	4.13	4.15	4.17	4.19	4.21
2	8.04	8.05	8.13	8.17	8.21	8.26	8.30	8.34	8.39	8.43
3	12.06	12.13	12.19	12.26	12.32	12.38	12.45	12.51	12.58	12.64
4	16.09	16.17	16.26	16.34	16.43	16.51	16.60	16.68	16.77	16.86
5	20.11	24.21	20.32	20.43	20.53	20.64	20.75	20.86	20.96	21.07
6	24.13	24.26	24.38	24.51	24.64	24.77	24.90	25.03	25.16	25.29
7	28.15	28.30	28.45	28.60	28.75	28.90	29.05	29.20	29.39	29.50
8	32.17	32.34	32.51	32.68	32.85	33.03	33.20	33.37	33.58	33.71
9	36.19	36.39	36.58	36.77	36.96	37.15	37.35	37.54	37.77	37.93
10	40.22	40.43	40.64	40.85	41.07	41.28	41.50	41.71	41.96	42.14
11	44.24	44.47	44.70	44.94	45.17	45.41	45.65	45.88	46.16	46.36
12	48.26	48.51	48.77	49.02	49.28	49.54	49.80	50.05	50.31	50.57
13	52.28	52.56	52.83	53.11	53.39	53.67	53.95	54.23	54.51	54.79
14	56.30	56.60	56.90	57.20	57.50	57.79	58.10	58.40	58.70	59.00
15	60.33	60.64	60.96	61.28	61.60	61.92	62.25	62.57	62.89	63.22
16	64.35	64.64	65.03	65.37	65.71	66.05	66.39	66.74	67.08	67.43
17	68.37	68.73	69.09	69.45	69.82	70.18	70.54	70.91	71.38	71.64
18	72.28	72.77	73.15	73.54	73.92	74.31	74.69	75.08	75.47	75.86
19	76.30	76.81	77.22	77.62	78.03	78.44	78.84	79.25	79.66	80.07
20	80.43	80.86	81.28	81.71	82.14	82.56	83.99	83.42	83.86	84.29
21	84.46	84.90	85.35	85.79	86.24	86.69	87.14	87.59	88.05	88.50
22	88.48	88.94	89.41	89.88	90.35	90.82	91.29	91.77	92.24	92.72
23	92.50	92.99	93.47	93.96	94.46	94.95	95.44	95.94	96.43	96.93
24	96.52	97.03	97.54	98.05	98.56	99.08	99.59	100.11	100.63	101.15
25	100.54	101.07	101.60	102.13	102.67	103.20	103.74	104.28	104.82	105.36
26	104.56	105.12	105.67	106.22	106.77	107.32	107.89	108.45	109.01	109.57
27	108.59	109.16	109.73	110.31	110.88	111.46	112.04	112.62	113.21	113.79
28	112.61	113.20	113.79	114.39	114.99	115.59	116.19	116.79	117.40	118.00
29	116.63	117.24	117.86	118.48	119.10	119.72	120.34	120.96	121.59	122.22
30	120.65	121.29	121.92	122.56	123.20	123.85	124.49	125.14	125.78	126.43
31	124.67	125.33	125.99	126.65	127.31	127.97	128.64	129.31	129.98	130.65

Cylinders in Ale-Gallons.

	39	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.42	0.43	0.43	0.43	0.43	0.43	0.44	0.44	0.44	0.44
.2	0.85	0.85	0.86	0.86	0.86	0.87	0.87	0.88	0.88	0.89
.3	1.27	1.28	1.29	1.29	1.30	1.30	1.31	1.32	1.32	1.33
.4	1.69	1.70	1.72	1.72	1.73	1.74	1.75	1.76	1.76	1.77
.5	2.12	2.13	2.15	2.15	2.16	2.17	2.18	2.19	2.21	2.22
.6	2.54	2.55	2.57	2.58	2.59	2.61	2.62	2.63	2.65	2.66
.7	2.96	2.98	3.00	3.01	3.03	3.04	3.06	3.07	3.09	3.10
.8	3.39	3.41	3.42	3.44	3.46	3.48	3.49	3.51	3.53	3.55
.9	3.81	3.83	3.85	3.87	3.89	3.91	3.93	3.95	3.97	3.99
Area	4.24	4.26	4.28	4.30	4.32	4.35	4.37	4.39	4.41	4.43
2	8.47	8.52	8.56	8.60	8.65	8.70	8.78	8.78	8.82	8.87
3	12.71	12.77	11.84	12.90	12.97	13.04	13.10	13.17	13.23	13.30
4	16.94	17.03	17.12	17.21	17.29	17.38	17.47	17.56	17.65	17.74
5	21.18	21.29	21.40	21.51	21.62	21.73	21.84	21.95	22.06	22.17
6	25.42	25.55	25.68	25.81	25.94	26.07	26.20	26.34	26.47	26.60
7	29.65	29.80	29.96	30.11	30.26	30.42	30.57	30.73	30.88	31.04
8	33.89	34.06	34.24	34.41	34.55	34.76	34.94	35.12	35.29	35.47
9	38.12	38.32	38.52	38.71	38.91	39.11	39.31	39.51	39.71	39.90
10	42.36	42.58	42.80	43.02	43.28	43.45	43.67	43.90	44.12	44.34
11	46.60	46.84	47.08	47.32	47.56	47.80	48.04	48.29	48.53	48.77
12	50.83	51.09	51.36	51.62	51.88	52.14	52.41	52.67	52.94	53.21
13	55.07	55.35	55.64	55.92	56.21	56.49	56.78	57.06	57.35	57.64
14	59.31	59.61	59.92	60.22	60.53	60.84	61.14	61.45	61.76	62.07
15	63.54	63.87	64.20	64.52	64.85	65.18	65.51	65.84	66.18	66.51
16	67.78	68.13	68.47	68.83	69.18	69.53	69.88	70.23	70.59	70.94
17	72.01	72.38	72.75	73.13	73.50	73.87	74.25	74.62	75.00	75.38
18	76.25	76.64	77.03	77.43	77.82	78.22	78.61	79.01	79.41	79.81
19	80.49	80.90	81.31	81.73	82.15	82.56	82.98	83.40	83.82	84.24
20	84.72	85.16	85.59	86.03	86.47	86.91	87.35	87.79	88.23	88.68
21	88.96	89.42	89.87	90.33	90.79	91.25	91.72	92.18	92.65	93.11
22	93.19	93.67	94.15	94.63	95.12	95.60	96.08	96.57	97.06	97.55
23	97.43	97.93	98.43	98.94	99.44	99.94	100.45	100.96	101.47	101.98
24	101.67	102.19	102.71	103.24	103.76	104.29	104.82	105.35	105.88	106.41
25	105.90	106.45	106.99	107.54	108.09	108.63	109.19	109.74	110.29	110.85
26	110.14	110.71	111.27	111.84	112.41	112.98	113.55	114.13	114.70	115.28
27	114.37	114.96	115.55	116.14	116.73	117.33	117.92	118.52	119.12	119.72
28	118.61	119.22	119.83	120.44	121.06	121.67	122.29	122.91	123.53	124.15
29	122.85	123.48	124.11	124.75	125.38	126.02	126.66	127.30	127.94	128.58
30	127.08	127.74	128.39	129.05	129.70	130.36	131.02	131.68	132.35	133.02
31	131.32	131.99	134.67	133.35	134.03	134.71	135.39	136.08	136.76	137.45

	40	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.45	0.45	0.45	0.45	0.45	0.46	0.46	0.46	0.46	0.47
.2	0.89	0.90	0.90	0.90	0.91	0.91	0.92	0.92	0.93	0.93
.3	1.34	1.34	1.35	1.36	1.36	1.37	1.38	1.38	1.39	1.40
.4	1.78	1.79	1.80	1.81	1.82	1.83	1.84	1.85	1.85	1.86
.5	2.23	2.24	2.25	2.26	2.27	2.28	2.30	2.31	2.32	2.33
.6	2.67	2.69	2.70	2.71	2.73	2.74	2.75	2.77	2.78	2.80
.7	3.12	3.13	3.15	3.17	3.18	3.20	3.21	3.23	3.25	3.26
.8	3.56	3.58	3.60	3.62	3.64	3.65	3.67	3.69	3.71	3.73
.9	4.01	4.03	4.05	4.07	4.09	4.11	4.13	4.15	4.17	4.19
Area	4.46	4.48	4.50	4.52	4.55	4.57	4.59	4.61	4.64	4.66
2	8.91	8.96	9.00	9.05	9.09	9.14	9.18	9.23	9.27	9.32
3	13.37	13.44	13.50	13.57	13.64	13.70	13.77	13.84	13.91	13.98
4	17.82	17.91	18.00	18.09	18.18	18.27	18.36	18.45	18.54	18.64
5	22.28	22.39	22.50	22.62	22.73	22.84	22.95	23.07	23.18	23.29
6	26.74	26.87	27.00	27.14	27.27	27.41	27.54	27.68	27.82	27.95
7	31.19	31.35	31.51	31.66	31.82	31.98	32.14	32.29	32.45	32.61
8	35.65	35.83	36.01	36.19	36.37	36.55	36.73	36.91	37.09	37.27
9	40.11	40.31	40.51	40.71	40.91	41.11	41.32	41.52	41.73	41.93
10	44.56	44.78	45.01	45.23	45.46	45.68	45.91	46.13	46.36	46.59
11	49.02	49.26	49.51	49.76	50.00	50.25	50.50	50.75	51.00	51.25
12	53.47	53.74	54.01	54.28	54.55	54.82	55.09	55.36	55.63	55.91
13	57.93	58.22	58.51	58.80	59.09	59.39	59.68	59.98	60.27	60.57
14	62.39	62.70	63.01	63.33	63.64	63.96	64.27	64.59	64.91	65.22
15	66.84	67.18	67.51	67.85	68.19	68.52	68.86	69.20	69.54	69.88
16	71.30	71.66	72.01	72.37	72.73	73.09	73.45	73.81	74.18	74.54
17	75.76	76.13	76.51	76.90	77.28	77.66	78.04	78.43	78.82	79.20
18	80.21	80.51	81.01	81.42	81.82	82.23	82.63	83.04	83.45	83.86
19	84.67	85.09	85.51	85.94	86.37	86.80	87.22	87.66	88.09	88.52
20	89.12	89.57	90.02	90.47	90.91	91.37	91.81	92.27	92.72	93.18
21	93.58	94.05	94.52	94.99	95.46	95.93	96.41	96.88	97.36	97.84
22	98.04	98.53	99.02	99.51	100.01	100.50	101.00	101.50	102.00	102.50
23	102.49	103.00	103.52	104.04	104.55	105.07	105.59	106.11	106.63	107.15
24	106.95	107.48	108.02	108.56	109.10	109.64	110.18	110.72	111.27	111.81
25	111.40	111.96	112.52	113.08	113.64	114.22	114.77	115.34	115.90	116.47
26	115.86	116.44	117.02	117.61	118.19	118.78	119.36	119.95	120.54	121.13
27	120.32	120.92	121.52	122.13	122.73	123.34	123.95	124.56	125.18	125.79
28	124.77	125.40	126.02	126.65	127.28	127.91	128.54	129.18	129.81	130.45
29	129.23	129.88	130.52	131.18	131.83	132.48	133.18	133.79	134.45	135.11
30	133.69	134.35	135.02	135.70	136.37	137.08	137.72	138.40	139.09	139.77
31	138.14	138.82	139.52	140.22	140.92	141.62	142.31	143.02	143.72	140.45

	41	.1	.2	.3	.4	.5	.6	.7	8.	9.
.1	0.47	0.47	0.47	0.47	0.48	0.48	0.48	0.48	0.49	0.49
.2	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.97	0.97	0.98
.3	1.40	1.41	1.42	1.42	1.43	1.44	1.45	1.45	1.46	1.47
.4	1.87	1.88	1.89	1.90	1.91	1.92	1.93	1.94	1.95	1.96
.5	2.34	2.35	2.36	2.37	2.39	2.40	2.41	2.42	2.43	2.44
.6	2.81	2.82	2.84	2.85	2.86	2.88	2.89	2.91	2.92	2.93
.7	3.28	3.29	3.31	3.33	3.34	3.36	3.37	3.39	3.41	3.42
.8	3.75	3.76	3.78	3.80	3.82	3.84	3.86	3.87	3.89	3.91
.9	4.21	4.23	4.25	4.28	4.30	4.32	4.34	4.36	4.38	4.40
Area	4.68	4.70	4.73	4.75	4.77	4.80	4.82	4.84	4.87	4.89
2	9.36	9.41	9.45	9.50	9.55	9.59	9.64	9.69	9.73	9.78
3	14.05	14.11	14.18	14.25	14.33	14.32	14.46	14.53	14.60	14.67
4	18.73	18.82	18.91	19.00	19.09	19.19	19.28	19.37	19.46	19.56
5	23.41	23.52	23.64	23.75	23.87	23.98	24.10	24.21	24.33	24.45
6	28.09	28.23	28.36	28.50	28.64	28.78	28.92	29.06	29.20	29.34
7	32.77	32.93	33.09	33.25	33.41	33.58	33.74	33.90	34.06	34.23
8	37.45	37.64	37.82	38.00	38.19	38.37	38.56	38.74	38.93	39.12
9	42.14	42.34	42.55	42.75	42.96	43.17	43.38	43.59	43.80	44.01
10	46.82	47.05	47.27	47.50	47.73	47.97	48.20	48.43	48.66	48.89
11	51.50	51.75	52.00	52.26	52.51	52.76	53.02	53.27	53.53	53.78
12	56.18	56.45	56.73	57.01	57.28	57.56	57.48	58.12	58.39	58.67
13	60.86	61.16	61.46	61.76	62.06	62.36	62.66	62.96	63.26	63.56
14	65.54	65.86	66.18	66.51	66.83	67.15	67.48	67.80	68.13	68.45
15	70.23	70.57	70.91	71.26	71.60	71.95	72.30	72.64	72.99	73.34
16	74.91	75.27	75.64	76.01	76.38	76.75	77.12	77.49	77.86	78.23
17	79.59	79.98	80.37	80.76	81.15	81.54	81.94	82.33	82.73	83.12
18	84.27	84.68	85.09	85.51	85.92	86.34	86.76	87.17	87.59	88.01
19	88.95	89.39	89.82	90.26	90.40	91.14	91.58	92.02	92.46	92.90
20	93.64	94.09	94.55	95.01	95.97	95.43	96.40	96.86	97.32	97.79
21	98.32	98.80	99.28	99.76	100.44	100.73	101.22	101.70	102.19	102.68
22	103.00	103.50	104.00	104.51	105.02	105.52	106.04	106.55	107.06	107.57
23	107.58	108.21	108.73	109.26	109.79	110.32	110.86	111.39	111.92	112.46
24	112.36	112.91	113.46	114.01	114.56	115.12	115.67	116.23	116.79	117.35
25	117.04	117.61	118.19	118.76	119.34	119.91	120.49	121.07	121.65	122.24
26	121.73	122.32	122.91	123.51	124.11	124.71	125.31	125.92	126.52	127.13
27	126.41	127.02	127.64	128.26	128.88	129.51	130.13	130.76	131.3	132.02
28	131.09	131.73	132.37	133.01	133.66	134.30	134.95	135.60	136.25	136.91
29	135.77	136.43	137.10	137.76	138.43	139.10	139.77	140.45	141.12	141.80
30	140.45	141.14	141.82	142.51	143.20	143.90	144.5	145.29	145.99	146.68
31	145.14	145.84	146.55	147.27	147.98	148.69	149.41	150.13	150.85	151.57

	42	1.	.2	.3	4.	.5	.6	.7	.8	.9
.1	0.49	0.49	0.50	0.50	0.50	0.50	0.51	0.51	0.51	0.51
.2	0.98	0.99	0.99	1.00	1.00	1.01	1.01	1.02	1.02	1.02
.3	1.47	1.48	1.49	1.49	1.50	1.51	1.52	1.52	1.53	1.54
.4	1.96	1.97	1.98	1.99	2.00	2.01	2.02	2.03	2.04	2.05
.5	2.46	2.47	2.48	2.49	2.50	2.51	2.53	2.54	2.55	2.56
.6	2.95	2.96	2.98	2.99	3.00	3.02	3.03	3.05	3.06	3.08
.7	3.44	3.46	3.47	3.49	3.50	3.52	3.54	3.55	3.57	3.59
.8	3.93	3.95	3.97	3.99	4.01	4.02	4.04	4.06	4.08	4.10
.9	4.42	4.44	4.46	4.48	4.51	4.53	4.55	4.57	4.59	4.61
Area	4.91	4.94	4.96	4.98	5.01	5.03	5.05	5.08	5.10	5.13
2	9.83	9.87	9.92	9.97	10.01	10.06	10.11	10.16	10.20	10.25
3	14.74	14.81	14.88	14.95	15.02	15.09	15.16	15.23	15.31	15.38
4	19.65	19.74	19.84	19.95	20.03	20.12	20.22	20.31	20.41	20.50
5	24.56	24.63	24.80	24.92	25.03	25.15	25.27	25.39	25.51	25.63
6	29.48	29.62	29.76	29.90	30.04	38.18	30.33	30.47	30.61	30.75
7	34.39	34.55	34.72	34.88	35.05	35.21	35.38	35.55	35.71	35.88
8	39.30	39.49	39.68	39.87	40.05	40.24	40.43	40.62	40.81	41.01
9	44.22	44.43	44.64	44.85	45.06	45.28	45.49	45.70	45.92	46.13
10	49.13	49.36	49.60	49.83	50.07	50.31	50.54	50.78	51.02	51.26
11	54.04	54.30	54.56	54.82	55.08	55.34	55.60	55.86	56.12	56.38
12	58.95	59.24	59.52	59.80	60.08	60.37	60.65	60.94	61.22	61.51
13	63.87	64.17	64.48	64.78	65.09	65.40	65.71	66.01	66.32	66.63
14	68.78	69.11	69.43	69.77	70.10	70.43	70.76	71.09	71.43	71.76
15	73.69	74.04	74.40	74.75	75.10	75.46	75.81	76.17	76.53	76.89
16	78.61	78.98	79.36	79.73	80.11	80.49	80.87	81.25	81.63	82.01
17	83.52	83.92	84.32	84.72	85.12	85.52	85.92	86.33	86.73	87.14
18	88.43	88.85	89.28	89.70	90.12	90.55	90.98	91.40	91.83	92.26
19	93.34	93.79	94.24	94.68	95.13	95.58	96.03	96.48	96.94	97.39
20	98.25	98.73	99.20	100.00	100.14	100.61	101.09	101.57	102.04	102.51
21	103.17	103.66	104.16	104.65	105.14	105.64	106.14	106.64	107.14	107.65
22	108.08	108.60	109.12	109.63	110.15	110.67	111.19	111.72	112.24	112.77
23	113.00	113.53	114.08	114.62	115.16	115.70	116.25	116.79	117.34	117.89
24	117.91	118.47	119.03	119.60	120.17	120.73	121.30	121.87	122.45	123.02
25	122.81	123.41	123.99	124.58	125.17	125.76	126.36	126.95	127.55	128.14
26	127.74	128.34	128.95	129.57	130.18	130.80	131.41	132.03	132.65	133.27
27	132.65	133.28	133.91	134.55	135.19	135.83	136.47	137.11	137.75	138.39
28	137.56	138.22	138.87	139.53	140.19	140.86	141.52	142.18	142.85	143.52
29	142.47	143.15	143.83	144.52	145.20	145.85	146.57	147.26	147.95	148.65
30	147.39	148.09	148.79	149.50	150.21	150.52	151.63	152.34	153.06	153.77
31	152.30	153.03	153.75	154.48	155.21	155.95	156.68	157.42	158.16	158.90

	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.51	0.52	0.52	0.52	0.52	0.53	0.53	0.53	0.53	0.54
.2	1.03	1.03	1.04	1.04	1.05	1.05	1.06	1.06	1.07	1.07
.3	1.54	1.55	1.56	1.57	1.57	1.58	1.59	1.60	1.60	1.61
.4	2.06	2.07	2.08	2.09	2.10	2.11	2.12	2.13	2.14	2.15
.5	2.57	2.59	2.60	2.61	2.62	2.63	2.65	2.66	2.67	2.68
.6	3.09	3.10	3.12	3.13	3.15	3.16	3.18	3.19	3.21	3.22
.7	3.60	3.62	3.64	3.65	3.67	3.69	3.71	3.72	3.74	3.76
.8	4.12	4.14	4.16	4.18	4.20	4.22	4.24	4.25	4.27	4.29
.9	4.63	4.66	4.68	4.70	4.72	4.74	4.76	4.79	4.81	4.83
Area	5.15	5.17	5.20	5.22	5.25	5.27	5.29	5.32	5.34	5.37
2	10.30	10.35	10.40	10.44	10.49	10.54	10.59	10.64	10.69	10.73
3	15.45	15.52	15.59	15.67	15.74	15.81	15.88	15.96	16.03	16.10
4	20.60	20.69	20.79	20.89	20.98	21.08	21.18	21.27	21.37	21.47
5	25.75	25.87	25.99	26.11	26.23	26.35	26.47	26.59	26.71	26.84
6	30.90	31.04	31.19	31.33	31.48	31.62	31.77	31.91	32.06	32.20
7	36.05	36.21	36.38	36.55	36.72	36.89	37.06	37.23	37.40	37.57
8	41.20	41.39	41.58	41.77	41.97	42.16	42.35	42.55	42.74	42.94
9	46.35	46.56	46.78	47.00	47.21	47.43	47.65	47.87	48.08	48.31
10	51.50	51.74	51.98	52.22	52.46	52.70	52.94	53.19	53.43	53.67
11	56.65	56.91	57.17	57.44	57.71	57.97	58.24	58.51	58.77	59.04
12	61.79	62.08	62.37	62.66	62.95	63.24	63.53	63.82	64.12	64.41
13	66.94	67.26	67.57	67.88	68.20	68.51	68.83	69.14	69.46	69.78
14	72.09	72.43	72.77	73.10	73.44	73.78	74.12	74.46	74.80	75.14
15	77.24	77.60	77.97	78.33	78.69	79.05	79.42	79.78	80.14	80.51
16	82.39	82.78	83.16	83.55	83.93	84.32	84.71	85.10	85.49	85.88
17	87.54	87.95	88.36	88.77	89.18	89.59	90.00	90.42	90.83	91.25
18	92.69	93.12	93.56	93.99	94.43	94.86	95.30	95.74	96.17	96.61
19	97.84	98.30	98.76	99.21	99.67	100.13	100.59	101.05	101.52	101.98
20	102.99	103.47	103.95	104.44	104.92	105.40	105.90	106.37	106.86	107.35
21	108.14	108.65	109.15	109.66	110.16	110.67	111.18	111.69	112.20	112.72
22	113.29	113.82	114.35	114.88	115.41	115.94	116.48	117.01	117.55	118.08
23	118.44	118.99	119.55	120.10	120.66	121.21	121.77	122.33	122.89	123.45
24	123.59	124.17	124.74	125.32	125.90	126.48	127.07	127.65	128.23	128.82
25	128.74	129.34	129.94	130.54	131.15	131.75	132.36	132.97	133.57	134.19
26	133.89	134.51	135.14	135.77	136.39	137.02	137.65	138.29	138.92	139.55
27	139.04	139.69	140.34	140.99	141.64	142.29	142.95	143.60	144.26	144.92
28	144.19	144.86	145.54	146.21	146.88	147.56	148.24	148.92	149.60	150.29
29	149.34	150.03	150.73	151.43	152.13	152.83	153.54	154.24	154.95	155.66
30	154.49	155.21	155.93	156.65	157.38	158.10	158.83	159.56	160.29	161.02
31	159.64	160.38	161.13	161.88	162.62	163.37	164.13	164.88	165.63	166.39

	44	.1	.2	.3	.4	5.	.6	.7	.8	.9
.1	0.54	0.54	0.54	0.55	0.55	0.55	0.55	0.56	0.56	0.56
.2	1.08	1.08	1.09	1.09	1.10	1.10	1.11	1.11	1.12	1.12
.3	1.62	1.62	1.63	1.64	1.65	1.65	1.66	1.67	1.68	1.68
.4	2.16	2.17	2.18	2.19	2.20	2.21	2.22	2.23	2.24	2.25
.5	2.70	2.71	2.72	2.73	2.74	2.76	2.77	2.78	2.79	2.81
.6	3.23	3.25	3.26	3.28	3.29	3.31	3.32	3.34	3.35	3.37
.7	3.77	3.79	3.81	3.83	3.84	3.86	3.88	3.90	3.91	3.93
.8	4.31	4.33	4.35	4.37	4.39	4.41	4.43	4.45	4.47	4.49
.9	4.85	4.87	4.90	4.92	4.94	4.96	4.99	5.01	5.03	5.05
Area	5.39	5.42	5.44	5.47	5.49	5.51	5.54	5.56	5.59	5.61
2	10.78	10.83	10.88	10.93	10.98	11.03	11.08	11.15	11.18	11.23
3	16.18	16.25	16.32	16.40	16.47	16.55	16.62	16.69	16.77	16.84
4	21.57	21.67	21.76	21.86	21.96	22.06	22.16	22.26	22.36	22.46
5	26.96	27.08	27.21	27.33	27.45	27.58	27.70	27.82	27.95	28.07
6	32.35	32.50	32.65	32.79	32.94	33.09	33.24	33.39	33.54	33.69
7	37.74	37.92	38.09	38.26	38.43	38.61	38.78	38.95	39.13	39.30
8	43.14	43.33	43.53	43.73	43.92	44.12	44.32	44.52	44.72	44.92
9	48.53	48.75	48.97	49.19	49.41	49.64	49.86	50.08	50.31	50.53
10	53.92	54.16	54.41	54.66	54.90	55.15	55.40	55.65	55.90	56.15
11	59.31	59.58	59.85	60.12	60.39	60.67	60.94	61.21	61.49	61.76
12	64.70	65.00	65.29	65.59	65.88	66.18	66.48	66.78	67.08	67.38
13	70.10	70.41	70.73	71.05	71.37	71.70	72.02	72.34	72.67	72.99
14	75.49	75.83	76.18	76.52	76.87	77.21	77.56	77.91	78.26	78.61
15	80.88	81.25	81.62	81.95	82.36	82.73	83.10	83.47	83.85	84.22
16	86.27	86.66	87.06	87.45	87.85	88.24	88.64	89.04	89.44	89.84
17	91.66	92.08	92.50	92.92	93.34	93.76	94.18	94.60	95.03	95.45
18	97.06	97.50	97.94	98.38	98.83	99.27	99.72	100.17	100.62	101.07
19	102.45	102.91	103.38	103.85	104.32	104.79	105.26	105.73	106.21	106.68
20	107.84	108.33	108.82	109.31	109.81	110.30	110.80	111.30	111.80	112.30
21	113.23	113.75	114.26	114.78	115.30	115.81	116.34	116.86	117.39	117.91
22	118.62	119.16	119.70	120.25	120.79	121.33	121.88	122.43	122.98	123.53
23	124.02	124.58	125.14	125.71	126.28	126.85	127.42	127.98	128.57	129.14
24	129.41	130.00	130.59	131.18	131.77	132.36	132.96	133.56	134.15	134.75
25	134.80	135.41	136.03	136.64	137.26	137.88	138.50	139.12	139.74	140.37
26	140.19	140.83	141.47	142.11	142.75	143.39	144.04	144.69	145.33	145.98
27	145.58	146.25	146.91	147.57	148.24	148.91	149.58	150.25	150.92	151.60
28	150.97	151.66	152.35	153.04	153.73	154.43	155.12	155.82	156.51	157.21
29	156.37	157.08	157.79	158.51	159.22	159.94	160.66	161.38	162.10	162.83
30	161.76	162.49	163.23	163.97	164.71	165.46	166.20	166.95	167.69	168.44
31	167.15	167.91	168.67	169.44	170.20	170.97	171.74	172.51	173.28	174.06

Cylinders in Ale-Gallons.

	.45	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.56	0.57	0.57	0.57	0.57	0.58	0.58	0.58	0.58	0.59
.2	1.13	1.13	1.14	1.14	1.15	1.15	1.16	1.16	1.17	1.17
.3	1.69	1.70	1.71	1.71	1.72	1.73	1.74	1.74	1.75	1.76
.4	2.26	2.27	2.28	2.29	2.30	2.31	2.32	2.33	2.34	2.35
.5	2.82	2.83	2.84	2.86	2.87	2.88	2.90	2.91	2.92	2.93
.6	3.38	3.40	3.41	3.43	3.44	3.46	3.47	3.49	3.50	3.52
.7	3.95	3.97	3.98	4.00	4.02	4.04	4.05	4.07	4.09	4.11
.8	4.51	4.53	4.55	4.57	4.59	4.61	4.63	4.65	4.67	4.69
.9	4.08	5.10	5.12	5.14	5.17	5.19	5.21	5.23	5.26	5.28
Area	5.64	5.66	5.69	5.72	5.74	5.77	5.79	5.82	5.84	5.87
2	11.28	11.33	11.38	11.43	11.48	11.53	11.58	11.63	11.68	11.74
3	16.92	16.99	17.07	17.15	17.22	17.30	17.37	17.45	17.53	17.60
4	22.56	22.65	22.76	22.86	22.96	23.06	23.16	23.27	23.37	23.47
5	28.20	28.32	28.45	28.58	28.70	28.83	28.96	29.08	29.21	29.34
6	33.84	33.99	34.14	34.29	34.44	34.60	34.75	34.90	35.05	35.21
7	39.48	39.65	39.83	40.01	40.18	40.36	40.54	40.72	40.89	41.07
8	45.12	45.32	45.52	45.72	45.92	46.13	46.33	46.53	46.74	46.94
9	50.76	50.98	51.21	51.44	51.60	51.89	52.12	52.35	52.58	52.81
10	56.40	56.65	56.90	57.15	57.40	57.66	57.91	58.17	58.42	58.68
11	62.04	62.31	62.59	62.87	63.15	63.42	63.70	63.98	64.26	64.54
12	67.68	67.98	68.28	68.58	68.89	69.19	69.49	69.80	70.10	70.41
13	73.32	73.64	73.97	74.30	74.63	74.96	75.29	75.62	75.95	76.28
14	78.96	79.31	79.66	80.01	80.37	80.72	81.08	81.43	81.79	82.15
15	84.60	84.97	85.35	85.73	86.11	86.49	86.87	87.25	87.63	88.02
16	90.24	90.64	91.04	91.44	91.85	92.25	92.66	93.07	93.47	93.88
17	95.88	96.30	96.73	97.16	97.59	98.02	98.45	98.88	99.32	99.75
18	101.52	101.97	102.42	102.88	103.33	103.79	104.24	104.70	105.16	105.62
19	107.16	107.63	108.11	108.59	109.07	109.55	110.03	110.52	111.00	111.49
20	112.80	113.30	113.80	114.31	114.81	115.32	115.82	116.33	116.84	117.35
21	118.44	118.96	119.49	120.02	120.55	121.08	121.61	122.15	122.68	123.22
22	124.08	124.63	125.18	125.74	126.29	126.85	127.41	127.97	128.53	129.09
23	129.72	130.29	130.87	131.45	132.03	132.62	133.20	133.78	134.37	134.96
24	135.35	135.96	136.56	137.17	137.77	138.38	138.99	139.60	140.21	140.82
25	140.99	141.62	142.25	142.88	143.51	144.15	144.78	145.42	146.05	146.69
26	146.63	147.29	147.94	148.60	149.25	149.91	150.57	151.23	151.89	152.56
27	152.27	152.95	153.63	154.31	154.99	155.68	156.36	157.05	157.74	158.43
28	157.91	158.62	159.32	160.03	160.73	161.44	162.15	162.87	163.58	164.30
29	163.55	164.28	165.01	165.74	166.47	167.21	167.94	168.68	169.42	170.16
30	169.19	169.95	170.70	171.46	172.21	172.98	173.74	174.50	175.26	176.03
31	174.83	175.61	176.39	177.17	177.96	178.74	179.53	180.32	181.10	181.90

	46	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.59	0.59	0.59	0.60	0.60	0.60	0.60	0.61	0.61	0.61
.2	1.18	1.18	1.19	1.19	1.20	1.20	1.21	1.21	1.22	1.22
.3	1.77	1.78	1.78	1.79	1.80	1.81	1.81	1.82	1.83	1.84
.4	2.36	2.37	2.38	2.39	2.40	2.41	2.42	2.43	2.44	2.45
.5	2.95	2.96	2.97	2.98	3.00	3.01	3.02	3.04	3.05	3.06
.6	3.54	3.55	3.57	3.58	3.60	3.61	3.63	3.64	3.66	3.68
.7	4.13	4.14	4.16	4.18	4.20	4.23	4.23	4.25	4.27	4.29
.8	4.72	4.73	4.76	4.78	4.80	4.84	4.84	4.86	4.88	4.90
.9	5.30	5.33	5.35	5.37	5.40	5.44	5.44	5.47	5.49	5.51
Area	5.89	5.92	5.94	5.97	6.00	6.02	6.05	6.07	6.10	6.13
2	11.17	11.84	11.89	11.94	11.99	12.04	12.10	12.15	12.20	12.25
3	11.76	17.76	17.83	17.91	17.99	18.07	18.14	18.22	18.30	18.38
4	23.57	23.68	23.78	23.88	23.98	24.09	24.19	24.30	24.40	24.50
5	29.47	29.59	29.72	29.85	29.98	30.11	30.24	30.37	30.50	30.63
6	35.36	35.51	35.67	35.82	35.98	36.13	36.29	36.44	36.60	36.76
7	41.25	41.43	41.61	41.79	41.97	42.15	42.34	42.52	42.70	42.88
8	47.15	47.35	47.56	47.76	47.97	48.18	48.38	48.59	48.80	49.01
9	53.04	53.27	53.50	53.73	53.97	54.20	54.43	54.67	54.90	55.13
10	58.93	59.19	59.45	59.70	59.96	60.22	60.48	60.74	61.00	61.26
11	64.83	65.11	65.39	65.67	65.96	66.24	66.53	66.81	67.10	67.39
12	70.72	71.03	71.33	71.64	71.95	72.26	72.58	72.89	73.20	73.51
13	76.61	76.95	77.28	77.61	77.95	78.29	78.62	78.96	79.30	79.64
14	82.51	82.86	83.22	83.59	83.95	84.31	84.67	85.04	85.40	85.77
15	88.40	88.78	89.17	89.56	89.94	90.33	90.72	91.11	91.50	91.89
16	94.29	94.70	95.11	95.53	95.94	96.35	96.77	97.18	97.60	98.02
17	100.19	100.62	101.06	101.50	101.94	102.38	102.82	103.26	103.70	104.14
18	106.08	106.54	107.00	107.47	107.93	108.40	108.86	109.33	109.80	110.27
19	111.97	112.46	112.95	113.44	113.93	114.42	114.91	115.41	115.90	116.40
20	117.87	118.38	118.89	119.41	119.92	120.44	120.96	121.48	122.00	122.52
21	123.76	124.30	124.84	125.38	125.92	126.46	127.01	127.55	128.10	128.65
22	129.65	130.22	130.78	131.35	131.92	132.49	133.06	133.63	134.20	134.77
23	135.55	136.13	136.73	137.32	137.91	138.51	139.10	139.70	140.30	140.90
24	141.44	142.05	142.67	143.29	143.91	144.53	145.15	145.78	146.40	147.03
25	147.33	147.97	148.61	149.26	149.90	150.55	151.20	151.85	152.50	153.15
26	153.23	153.89	154.56	155.23	155.90	156.57	157.25	157.92	158.60	159.28
27	159.12	159.81	160.50	161.20	161.90	162.60	163.30	164.00	164.70	165.40
28	165.01	165.73	166.45	167.17	167.89	168.62	169.34	170.07	170.80	171.53
29	170.91	171.65	172.39	173.14	173.89	174.64	175.39	176.15	176.90	177.66
30	176.80	177.57	178.34	179.11	179.89	180.66	181.44	182.22	183.00	183.78
31	182.69	183.49	184.28	185.08	185.88	186.68	187.49	188.29	189.10	189.91

	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.61	0.62	0.62	0.63	0.63	0.63	0.63	0.64	0.64
.2	1.23	1.24	1.25	1.25	1.26	1.26	1.27	1.27	1.28
.3	1.85	1.84	1.87	1.87	1.88	1.88	1.89	1.90	1.91	1.92
.4	2.46	2.47	2.49	2.49	2.50	2.51	2.52	2.53	2.55	2.56
.5	3.08	3.09	3.10	3.12	3.13	3.14	3.15	3.17	3.19	3.19
.6	36.9	3.71	3.72	3.74	3.75	3.77	3.79	3.80	3.82	3.83
.7	43.1	4.32	4.34	4.36	4.38	4.40	4.42	4.44	4.45	4.47
.8	49.2	4.94	4.96	4.98	5.01	5.03	5.05	5.07	5.09	5.11
.9	55.3	5.56	5.58	5.61	5.63	5.66	5.68	5.70	5.73	5.75
Area	6.15	6.18	6.20	6.23	6.26	6.28	6.31	6.34	6.36	6.39
2	12.30	12.36	12.41	12.46	12.51	12.57	12.62	12.67	12.73	12.78
3	18.46	18.54	18.61	18.69	18.77	18.85	18.93	19.01	19.06	19.17
4	24.61	24.71	24.82	24.92	25.03	25.14	25.24	25.35	25.45	25.56
5	30.76	30.89	31.02	31.16	31.29	31.42	31.55	31.68	31.82	31.95
6	36.91	37.07	37.23	37.39	37.54	37.70	37.86	38.02	38.18	38.34
7	43.07	43.25	43.43	43.62	43.80	43.99	44.17	44.36	44.54	44.73
8	49.22	49.43	49.64	49.85	50.06	50.27	50.48	50.69	50.91	51.12
9	55.37	55.61	55.84	56.08	56.32	56.55	56.79	57.03	57.27	57.51
10	61.52	61.78	62.05	62.31	62.57	62.84	63.10	63.37	63.63	63.90
11	67.67	67.96	68.25	68.54	68.83	69.12	69.41	69.71	70.00	70.29
12	73.83	74.14	74.46	74.77	75.09	75.41	75.72	76.04	76.36	76.68
13	79.98	80.32	80.66	81.00	81.35	81.69	82.03	82.38	82.73	83.07
14	86.13	86.50	86.87	87.24	87.60	87.97	88.35	88.72	89.09	89.46
15	92.28	92.68	93.07	93.47	93.86	94.26	94.66	95.05	95.45	95.85
16	98.44	98.86	99.28	99.70	100.12	100.55	100.97	101.39	101.82	102.24
17	104.59	105.03	105.48	105.93	106.38	106.83	107.28	107.73	108.18	108.63
18	110.74	111.21	111.69	112.16	112.63	113.11	113.59	114.06	114.54	115.02
19	116.89	117.39	117.89	118.39	118.89	119.39	119.90	120.40	120.91	121.41
20	123.05	123.57	124.10	124.62	125.15	125.68	126.21	126.74	127.27	127.80
21	129.20	129.75	130.30	130.85	131.41	131.96	132.52	133.07	133.63	134.15
22	135.35	135.93	136.51	137.08	137.66	138.25	138.83	139.41	140.00	140.58
23	141.50	142.11	142.71	143.31	143.92	144.53	145.14	145.75	146.36	146.97
24	147.65	148.28	148.91	149.55	150.18	150.81	151.45	152.09	152.72	153.36
25	153.81	154.46	155.12	155.78	156.44	157.10	157.76	158.42	159.09	159.75
26	159.96	160.64	161.32	162.04	162.69	163.38	164.07	162.76	165.45	166.14
27	166.11	166.82	167.53	168.24	168.95	169.66	170.38	171.10	171.81	172.54
28	172.26	173.00	173.73	174.47	175.21	175.95	176.69	177.43	178.18	178.93
29	178.42	179.18	179.94	180.70	181.47	182.22	183.00	183.77	184.54	185.32
30	184.57	185.39	186.14	186.93	187.72	188.52	189.31	190.15	190.90	191.71
31	190.72	191.53	192.35	193.16	193.98	194.80	195.62	196.44	197.27	198.10

	48	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.64	0.64	0.65	0.65	0.65	0.65	0.66	0.66	0.69	0.67
.2	1.28	1.29	1.29	1.30	1.30	1.31	1.32	1.32	1.33	1.33
.3	1.92	1.93	1.94	1.95	1.96	1.97	1.97	1.98	1.99	2.00
.4	2.57	2.58	2.59	2.60	2.61	2.62	2.63	2.64	2.65	2.66
.5	3.21	3.22	3.23	3.25	3.26	3.28	3.29	3.30	3.31	3.33
.6	3.85	3.87	3.88	3.90	3.91	3.93	3.95	3.96	3.98	4.00
.7	4.49	4.51	4.53	4.55	4.57	4.59	4.60	4.62	4.64	4.66
.8	5.13	5.15	5.18	5.20	5.22	5.24	5.26	5.28	5.31	5.33
.9	5.77	5.80	5.82	5.85	5.87	5.90	5.92	5.94	5.97	5.99
Area	6.42	6.44	6.47	6.50	6.52	6.55	6.58	6.61	6.36	6.66
2	12.83	12.89	12.94	12.95	13.05	13.10	13.16	13.21	13.26	13.32
3	19.25	19.33	19.41	19.45	19.57	19.65	19.73	19.82	19.90	19.98
4	25.67	25.77	25.88	25.99	26.10	26.20	26.31	26.42	26.53	26.64
5	32.08	32.22	32.35	32.49	32.62	32.76	32.89	33.03	33.16	33.30
6	38.50	38.66	38.82	38.98	39.15	39.31	39.47	39.63	39.79	39.96
7	44.92	45.10	45.29	45.48	45.67	45.86	46.05	46.24	46.43	46.62
8	51.33	51.55	51.76	51.98	52.19	52.41	52.63	52.84	53.06	53.28
9	57.75	57.99	58.23	58.48	58.72	58.96	59.20	59.45	59.69	59.94
10	61.17	64.44	64.70	64.97	65.24	65.51	65.78	66.05	66.32	66.60
11	70.59	70.88	71.18	71.47	71.77	72.06	72.36	71.66	72.96	73.16
12	77.00	77.32	77.65	77.97	78.29	78.62	78.94	79.26	79.59	79.92
13	83.42	83.77	84.12	84.46	84.82	85.17	85.52	85.87	86.22	86.58
14	89.84	90.21	90.59	90.96	91.34	91.72	92.10	92.48	92.85	93.24
15	96.25	96.65	97.06	97.46	97.86	98.27	98.67	99.08	99.49	99.90
16	102.67	103.10	103.53	103.96	104.39	104.82	105.25	105.69	106.12	106.56
17	109.09	109.54	110.00	110.45	110.91	111.37	111.83	112.29	112.75	113.22
18	115.50	115.98	116.47	116.95	117.44	117.92	118.41	118.90	119.38	119.88
19	121.92	122.43	122.94	123.45	123.96	124.47	124.99	125.50	126.02	126.54
20	128.34	128.87	129.41	129.95	130.49	131.03	131.57	132.11	132.65	133.20
21	134.75	135.32	135.88	136.44	137.01	137.58	138.14	138.71	139.28	139.86
22	141.17	141.76	142.35	142.94	143.53	144.13	144.72	145.32	145.91	146.52
23	147.59	148.20	148.82	149.44	150.06	150.68	151.30	151.92	152.55	153.18
24	154.01	154.65	155.29	155.93	156.58	157.23	157.88	158.53	159.18	159.83
25	160.42	161.09	161.76	162.43	163.11	163.78	164.46	165.13	165.81	166.49
26	166.84	167.53	168.23	168.93	169.63	170.33	171.04	171.74	172.44	173.15
27	173.26	173.98	175.70	175.43	176.16	176.88	177.61	178.35	179.08	179.81
28	179.67	180.42	181.17	181.92	182.68	183.44	184.19	184.95	185.71	186.47
29	186.09	187.86	187.64	188.42	189.20	189.95	150.74	191.56	192.34	193.13
30	192.51	193.31	194.11	194.92	195.72	196.54	197.35	198.16	198.97	199.79
31	198.92	199.75	200.59	101.42	202.25	203.09	203.93	204.77	205.61	206.45

	49	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.67	0.67	0.67	0.68	0.68	0.68	0.68	0.69	0.69	0.69
.2	1.34	1.34	1.35	1.35	1.36	1.36	1.37	1.38	1.38	1.39
.3	2.01	2.01	2.02	2.03	2.04	2.05	2.06	2.07	2.07	2.08
.4	2.67	2.69	2.70	2.71	2.72	2.73	2.74	2.76	2.76	2.77
.5	3.34	3.36	3.37	3.38	3.40	3.41	3.43	3.45	3.45	3.47
.6	4.01	4.03	4.04	4.06	4.08	4.09	4.11	4.13	4.14	4.16
.7	4.68	4.70	4.72	4.74	4.76	4.78	4.80	4.82	4.83	4.85
.8	5.35	5.37	5.39	5.42	5.44	5.46	5.48	5.50	5.53	5.55
.9	6.02	6.04	6.07	6.09	6.12	6.14	6.17	6.19	6.22	6.24
Area	6.69	6.71	6.74	6.77	6.80	6.82	6.85	6.88	6.91	6.93
2	13.37	13.43	13.48	13.54	13.59	13.65	13.70	13.76	13.81	13.87
3	20.06	20.14	20.22	20.31	20.39	20.47	20.56	20.64	20.72	20.80
4	26.75	26.86	26.97	27.08	27.19	27.30	27.41	27.52	27.63	27.74
5	33.43	33.57	33.71	33.85	33.98	34.12	34.26	34.40	34.54	34.67
6	40.12	40.29	40.45	40.61	40.78	40.94	41.11	41.28	41.44	41.61
7	46.81	47.00	47.19	47.38	47.58	47.77	47.96	48.16	48.35	48.54
8	53.50	53.71	53.93	54.15	54.37	54.59	54.81	55.03	55.26	55.48
9	60.18	60.43	60.68	60.92	61.17	61.42	61.67	61.92	62.16	62.41
10	66.87	67.14	67.42	67.69	67.97	68.24	68.52	68.79	69.07	69.35
11	73.56	73.86	74.16	74.46	74.76	75.07	75.37	75.67	75.98	76.28
12	80.24	80.57	80.90	81.23	81.56	81.89	82.22	82.55	82.89	83.22
13	86.93	87.29	87.64	88.00	88.36	88.71	89.07	89.43	89.79	90.15
14	93.62	94.00	94.38	94.77	95.15	95.54	95.92	96.31	96.70	97.09
15	100.30	100.71	101.13	101.54	101.95	102.36	102.78	103.19	103.61	104.02
16	106.99	107.43	107.87	108.31	108.75	109.19	109.63	110.07	110.51	110.96
17	113.68	114.14	114.62	115.08	115.54	116.01	116.48	116.95	117.42	117.89
18	120.38	120.86	121.35	121.85	122.34	122.84	123.33	123.83	124.33	124.83
19	127.02	127.57	129.09	128.61	129.14	129.66	130.18	130.71	131.24	131.76
20	133.70	134.29	134.83	135.38	135.93	136.48	137.04	137.59	138.14	138.70
21	140.43	141.00	141.58	142.15	142.73	143.31	143.89	144.47	145.05	145.63
22	147.11	147.71	148.32	148.92	149.52	150.12	150.74	151.35	151.96	152.57
23	153.80	154.43	153.05	155.69	156.32	156.96	157.59	158.23	158.87	159.50
24	160.49	161.14	161.80	162.46	163.12	163.78	164.44	165.11	165.77	166.44
25	167.17	167.86	168.54	169.23	169.91	170.60	171.29	171.98	172.68	173.37
26	173.86	174.57	175.28	176.00	176.71	177.43	178.15	178.86	179.59	180.31
27	180.55	181.29	182.03	181.77	183.51	184.25	185.00	185.74	186.49	187.24
28	187.24	188.00	188.77	189.54	190.30	191.08	191.85	192.62	193.40	194.18
29	193.92	194.71	195.51	196.31	197.10	197.90	198.70	199.50	200.31	201.11
30	200.61	201.43	202.25	203.08	203.90	204.73	105.55	206.38	207.22	208.05
31	207.30	208.14	208.99	209.84	210.69	211.55	112.41	213.26	214.12	214.98

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.70	0.70	0.70	0.70	0.71	0.71	0.71	0.72	0.72	0.72
.2	1.39	1.40	1.40	1.41	1.41	1.42	1.43	1.43	1.44	1.44
.3	2.09	2.10	2.11	2.11	2.12	2.13	2.14	2.15	2.16	2.16
.4	2.78	2.80	2.81	2.82	2.83	2.84	2.85	2.86	2.87	2.89
.5	3.48	3.50	3.51	3.62	3.54	3.55	3.57	3.58	3.59	3.61
.6	4.18	4.19	4.21	4.23	4.24	4.26	4.28	4.30	4.31	4.33
.7	4.87	4.89	4.91	4.93	4.95	4.97	4.99	5.01	5.03	5.05
.8	5.57	5.59	5.61	5.64	5.66	5.68	5.70	5.73	5.75	5.77
.9	6.27	6.29	6.32	6.34	6.37	6.39	6.42	6.44	6.47	6.49
Area	6.96	6.99	7.02	7.95	7.07	7.10	7.13	7.16	7.19	7.22
2	13.93	13.98	14.04	14.09	14.15	14.21	14.26	14.32	14.37	14.43
3	20.89	20.97	21.06	21.14	21.22	21.31	21.39	21.48	21.56	21.65
4	27.85	27.96	28.07	28.19	28.30	28.41	28.52	28.64	28.75	28.86
5	34.81	34.95	35.09	35.23	35.37	35.51	35.65	35.80	35.94	36.08
6	41.78	41.94	42.11	42.28	42.45	42.62	42.79	42.95	43.12	43.29
7	48.74	48.93	49.13	49.33	49.52	49.72	49.92	50.11	50.31	50.51
8	55.70	55.92	56.15	56.37	56.60	56.82	57.05	57.27	57.50	57.73
9	62.66	62.92	63.17	63.42	63.67	63.92	64.18	64.43	64.69	64.94
10	69.63	69.91	70.19	70.47	70.75	71.03	71.31	71.59	71.87	72.16
11	76.59	76.90	77.20	77.51	77.82	78.13	78.44	78.75	79.06	79.37
12	83.55	83.89	84.22	84.56	84.89	85.23	85.57	85.91	86.25	86.59
13	90.52	90.88	91.24	91.61	91.97	92.33	92.70	93.07	93.43	93.80
14	97.48	97.87	98.26	98.65	99.04	99.44	99.83	100.23	100.62	101.02
15	104.44	104.86	105.28	105.70	106.12	106.54	106.96	107.39	107.81	108.24
16	111.40	111.85	112.30	112.75	113.19	113.64	114.09	114.55	115.00	115.45
17	118.37	118.84	119.32	119.79	120.27	120.75	121.22	121.70	122.18	122.67
18	125.33	125.83	126.33	126.84	127.34	127.85	128.36	128.86	129.37	129.88
19	132.29	132.82	133.35	133.89	134.42	134.95	135.49	136.02	136.56	137.10
20	139.26	139.81	140.37	140.93	141.49	142.05	142.62	143.18	143.75	144.31
21	146.22	146.80	147.39	147.98	148.57	149.16	149.75	150.34	150.93	151.53
22	153.18	153.79	154.41	155.02	155.64	156.26	156.88	157.50	158.12	158.75
23	160.14	160.78	161.43	162.07	162.72	163.36	164.01	164.66	165.31	165.96
24	167.11	167.77	168.45	169.12	169.79	170.46	171.14	171.82	172.49	173.18
25	174.07	174.76	175.46	176.16	176.86	177.57	178.27	178.98	179.68	180.39
26	181.03	181.76	182.48	183.21	183.94	184.67	185.40	186.14	186.87	187.61
27	188.00	188.75	189.50	190.26	191.01	191.77	192.53	193.30	194.06	194.82
28	194.96	195.74	196.52	197.30	198.09	198.88	199.66	200.45	201.24	202.04
29	201.92	202.73	203.54	204.35	205.16	205.98	206.80	207.61	208.43	209.25
30	208.88	209.72	210.56	211.40	212.24	213.08	213.93	214.77	215.62	216.47
31	215.85	216.71	217.58	218.44	219.31	220.18	221.06	221.93	222.81	223.69

UMI

	,1	,2	,3	,4	,5	,6	,7	,8	,9
1	0.73	0.73	0.73	0.74	0.74	0.74	0.74	0.75	0.75
2	1.46	1.46	1.47	1.47	1.48	1.48	1.49	1.49	1.50
3	2.19	2.20	2.21	2.21	2.22	2.23	2.23	2.24	2.25
4	2.92	2.93	2.94	2.94	2.95	2.97	2.98	2.99	3.00
5	3.65	3.66	3.67	3.68	3.69	3.71	3.72	3.74	3.75
6	4.38	4.39	4.40	4.41	4.43	4.45	4.47	4.48	4.50
7	5.09	5.11	5.13	5.15	5.17	5.19	5.21	5.23	5.25
8	5.82	5.84	5.86	5.89	5.91	5.93	5.96	5.98	6.00
9	6.55	6.57	6.60	6.62	6.65	6.67	6.70	6.73	6.75
Arie	7.27	7.30	7.33	7.36	7.39	7.42	7.42	7.47	7.50
1	14.59	14.66	14.66	14.72	14.77	14.83	14.89	14.95	15.00
2	21.73	21.82	21.90	21.99	22.07	22.16	22.25	22.33	22.42	22.51
3	28.98	29.09	29.20	29.32	29.43	29.55	29.66	29.78	29.89	30.01
4	36.22	36.36	36.50	36.65	36.79	36.93	37.08	37.22	37.37	37.51
5	43.46	43.63	43.81	43.98	44.15	44.32	44.49	44.67	44.84	45.01
6	50.71	50.91	51.11	51.31	51.51	51.71	51.91	52.11	52.31	52.51
7	57.95	58.18	58.41	58.64	58.86	59.09	59.32	59.55	59.78	60.02
8	65.20	65.45	65.71	65.97	66.22	66.48	66.74	67.00	67.26	67.52
9	72.44	72.72	73.01	73.29	73.58	73.87	74.15	74.44	74.73	75.02
10	79.68	80.00	80.31	80.62	80.94	81.25	81.57	81.89	82.20	82.52
11	86.93	87.27	87.61	87.95	88.30	88.64	88.99	89.33	89.68	90.02
12	94.17	94.54	94.91	95.28	95.65	96.03	96.40	96.78	97.15	97.53
13	101.42	101.81	102.21	102.61	103.01	103.41	103.82	104.22	104.62	105.03
14	108.66	109.09	109.51	109.94	110.37	110.80	111.23	111.66	112.10	112.53
15	115.90	116.36	116.82	117.27	117.73	118.19	118.65	119.11	119.57	120.03
16	123.15	123.63	124.12	124.60	125.09	125.58	126.06	126.55	127.04	127.53
17	130.39	130.90	131.42	131.93	132.45	132.96	133.48	134.00	134.52	135.04
18	137.64	138.18	138.72	139.26	139.80	140.35	140.89	141.44	141.98	142.54
19	144.88	145.45	146.02	146.59	147.16	147.74	148.31	148.89	149.46	150.04
20	152.12	152.72	153.32	153.92	154.52	155.12	155.73	156.33	156.93	157.54
21	159.37	159.99	160.62	161.25	161.88	162.51	163.12	163.77	164.41	165.04
22	166.61	167.27	167.92	168.58	169.24	169.90	170.56	171.22	171.88	172.55
23	173.86	174.54	175.22	175.91	176.59	177.28	177.97	178.66	179.35	180.05
24	181.10	181.81	182.52	183.24	183.95	184.67	185.39	186.11	186.83	187.55
25	188.34	189.08	189.83	190.57	191.31	192.06	192.80	193.55	194.30	195.05
26	194.59	196.36	197.13	197.90	198.67	199.44	200.22	201.00	201.77	202.55
27	202.83	203.63	204.43	205.23	206.03	206.83	207.63	208.44	209.25	210.06
28	211.08	210.90	211.73	212.56	213.38	214.22	215.05	215.88	216.72	217.56
29	217.32	218.17	219.03	219.88	220.74	221.60	222.46	223.33	224.19	225.06
30	223.58	223.45	226.33	227.21	228.10	228.99	229.88	230.77	231.67	232.56

	.2	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.75	0.76	0.76	0.76	0.76	0.77	0.77	0.77	0.78	0.78
.2	1.51	1.51	1.52	1.52	1.53	1.54	1.54	1.55	1.55	1.56
.3	2.26	2.27	2.28	2.28	2.29	2.30	2.31	2.32	2.33	2.34
.4	3.01	3.02	3.04	3.05	3.06	3.07	3.08	3.09	3.11	3.12
.5	3.77	3.78	3.79	3.81	3.82	3.84	3.85	3.87	3.88	3.90
.6	4.52	4.54	4.55	4.57	4.58	4.61	4.62	4.64	4.66	4.68
.7	5.27	5.29	5.31	5.33	5.35	5.37	5.39	5.41	5.43	5.46
.8	6.03	6.05	6.07	6.09	6.12	6.14	6.16	6.19	6.21	6.24
.9	6.78	6.80	6.83	6.86	6.88	6.91	6.93	6.96	6.99	7.01
Area	7.53	7.56	7.59	7.62	7.65	7.68	7.71	7.73	7.76	7.79
2	15.06	15.12	15.18	15.24	15.29	15.35	15.41	15.47	15.53	15.59
3	22.59	22.68	22.77	22.85	22.94	23.03	23.12	23.20	23.29	23.38
4	30.12	30.24	30.36	30.47	30.59	30.71	30.82	30.94	31.06	31.18
5	37.65	37.80	37.94	38.09	38.24	38.38	38.53	38.67	38.82	38.97
6	45.19	45.36	45.53	45.71	45.88	46.06	46.23	46.41	46.59	46.76
7	52.72	52.92	53.12	53.33	53.53	53.73	53.94	54.14	54.35	54.56
8	60.25	60.48	60.71	60.94	61.18	61.41	61.65	61.88	62.12	62.35
9	67.78	68.04	68.30	68.56	68.82	69.09	69.35	69.61	69.88	70.14
10	75.31	75.60	75.89	76.18	76.47	76.76	77.06	77.35	77.64	77.94
11	82.84	83.16	83.48	83.80	84.12	84.44	84.76	85.08	85.41	85.73
12	90.37	90.72	91.07	91.42	91.77	92.12	92.47	92.82	93.17	93.53
13	97.90	98.28	98.66	99.03	99.41	99.79	100.17	100.55	100.94	101.32
14	105.43	105.84	106.25	106.65	107.06	107.47	107.88	108.29	108.70	109.11
15	112.96	113.40	113.83	114.27	114.71	115.15	115.59	116.02	116.47	116.91
16	120.49	120.96	121.42	121.89	122.35	122.82	123.29	123.76	124.23	124.70
17	128.03	128.52	129.01	129.51	130.00	130.50	131.00	131.49	131.99	132.49
18	135.56	136.08	136.60	137.13	137.65	138.17	138.70	139.23	139.76	140.29
19	143.09	143.64	144.19	144.74	145.30	145.85	146.41	146.96	147.52	148.08
20	150.62	151.20	151.78	152.36	152.94	153.53	154.11	154.70	155.29	155.88
21	158.15	158.76	159.37	159.98	160.59	161.20	161.82	162.43	163.05	163.67
22	165.68	166.32	166.96	167.60	168.24	168.88	169.53	170.17	170.82	171.46
23	173.21	173.88	174.55	175.22	175.85	176.56	177.23	177.90	178.58	179.26
24	180.74	181.44	182.14	182.83	183.53	184.23	184.94	185.64	186.35	187.05
25	188.27	189.00	189.72	190.45	191.18	191.91	192.64	193.37	194.11	194.84
26	195.80	196.56	197.31	198.07	198.83	199.59	200.35	201.11	201.87	202.64
27	203.33	204.12	204.90	205.69	206.47	207.26	208.05	208.84	209.64	210.43
28	210.86	211.68	212.49	213.31	214.12	214.94	215.76	216.58	217.40	218.23
29	218.40	219.24	220.08	220.92	221.77	222.62	223.47	224.31	225.17	226.02
30	225.93	226.80	227.67	228.54	229.42	230.29	231.17	232.05	232.93	233.81
31	233.46	234.36	235.26	236.16	237.06	237.97	238.88	239.78	240.70	241.61

Cylinders in Ale-Gallons.

	.53	1.	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.78	0.79	0.79	0.79	0.79	0.80	0.80	0.80	0.81	0.81
.2	1.56	1.57	1.58	1.58	1.59	1.59	1.60	1.61	1.61	1.62
.3	2.35	2.36	2.36	2.37	2.38	2.39	2.40	2.41	2.42	2.43
.4	3.13	3.14	3.15	3.16	3.18	3.19	3.20	3.21	3.22	3.24
.5	3.91	3.93	3.94	3.96	3.97	3.99	4.00	4.02	4.03	4.05
.6	4.69	4.71	4.73	4.75	4.76	4.78	4.80	4.82	4.84	4.85
.7	5.48	5.50	5.52	5.54	5.56	5.58	5.60	5.62	5.64	5.66
.8	6.26	6.28	6.31	6.33	6.35	6.38	6.40	6.42	6.45	6.47
.9	7.04	7.07	7.09	7.12	7.15	7.17	7.20	7.23	7.25	7.28
Area	7.82	7.85	7.88	7.91	7.94	7.97	8.00	8.03	8.06	8.09
2	15.65	15.71	15.76	15.82	15.88	15.94	16.00	16.00	16.12	16.18
3	23.47	23.56	23.65	23.74	23.83	23.91	24.00	24.09	24.18	24.27
4	31.29	31.41	31.53	31.65	31.77	31.89	32.01	32.13	32.24	32.36
5	39.12	39.26	39.41	39.56	39.71	39.86	40.01	40.16	40.31	40.46
6	46.94	47.12	47.29	47.47	47.65	47.83	48.01	48.19	48.37	48.55
7	54.76	54.97	55.18	55.39	55.59	55.80	56.01	56.22	56.43	56.64
8	62.59	62.82	63.06	63.30	63.53	63.77	64.01	64.25	64.49	64.73
9	70.41	70.68	70.94	71.21	71.48	71.74	72.01	72.28	72.55	72.82
10	78.23	78.53	78.82	79.12	79.42	79.72	80.01	80.31	80.61	80.91
11	86.06	86.38	86.71	87.03	87.36	87.69	88.02	88.35	88.67	89.00
12	93.88	94.23	94.59	94.95	95.30	95.66	96.02	96.38	96.74	197.10
13	101.70	102.09	102.47	102.86	103.24	103.63	104.02	104.41	104.80	105.19
14	109.53	109.94	110.35	110.77	111.19	111.60	112.02	112.44	112.86	113.28
15	117.35	117.79	118.24	118.68	119.13	119.58	120.02	120.47	120.92	121.37
16	125.17	125.65	126.12	126.59	127.07	127.55	128.02	128.50	128.93	125.46
17	133.00	133.50	134.00	134.51	135.01	135.52	136.03	136.53	137.04	137.55
18	140.82	141.35	141.88	142.42	142.95	143.49	144.03	144.56	145.10	145.64
19	148.64	149.20	149.77	150.33	150.90	151.46	152.03	152.60	153.16	153.73
20	156.47	157.06	157.65	158.24	158.84	159.43	160.03	160.63	161.23	161.83
21	164.29	164.91	165.53	166.16	166.78	167.41	168.03	168.66	169.29	169.92
22	172.11	172.76	173.41	174.07	174.72	175.38	176.03	176.69	177.35	178.01
23	179.94	180.62	181.30	181.98	182.66	183.35	184.03	184.72	185.41	186.10
24	187.76	188.47	189.18	189.89	190.61	191.32	192.03	192.75	193.47	194.19
25	195.58	196.32	197.06	197.80	198.55	199.25	200.04	200.78	201.53	202.28
26	203.41	204.18	204.94	205.72	206.49	207.26	208.04	208.82	209.59	210.37
27	211.23	212.03	212.83	213.63	214.43	215.24	216.04	216.85	217.65	218.46
28	219.05	219.88	220.71	221.54	222.37	223.21	224.04	224.88	225.72	226.56
29	226.88	227.73	228.55	229.45	230.31	231.18	232.04	232.91	233.78	234.65
30	234.70	235.59	236.47	237.37	238.26	239.15	240.04	240.94	241.84	242.74
31	242.52	243.44	244.36	245.28	246.20	247.12	248.05	248.97	249.90	250.83

	54	.1	.2	.3	.4	5.	.6	.7	.8	.9
.1	0.81	0.81	0.82	0.82	0.82	0.83	0.83	0.83	0.84	0.84
.2	1.62	1.63	1.64	1.64	1.65	1.65	1.66	1.67	1.67	1.68
.3	2.44	2.45	2.45	2.46	2.47	2.48	2.49	2.50	2.51	2.52
.4	3.25	3.26	3.27	3.28	3.30	3.31	3.32	3.33	3.35	3.36
.5	4.06	4.08	4.09	4.11	4.12	4.14	4.15	4.17	4.18	4.20
.6	4.87	4.89	4.91	4.93	4.94	4.96	4.98	5.00	5.02	5.04
.7	5.68	5.71	5.73	5.75	5.77	5.79	5.81	5.83	5.85	5.88
.8	6.50	6.52	6.54	6.57	6.59	6.62	6.64	6.67	6.69	6.72
.9	7.31	7.34	7.36	7.39	7.42	7.44	7.47	7.50	7.53	7.55
Area	8.12	8.15	8.18	8.21	8.24	8.27	8.30	8.33	8.36	8.39
2	16.24	16.30	16.36	16.42	16.48	16.54	16.61	16.67	16.73	16.79
3	24.36	24.45	24.54	24.64	24.73	24.82	24.91	25.00	25.09	25.18
4	32.49	32.61	32.73	32.85	32.97	33.09	33.21	33.33	33.45	33.58
5	40.61	40.76	40.91	41.06	41.21	41.36	41.51	41.67	41.82	41.97
6	48.73	48.91	49.09	49.27	49.45	49.63	49.82	50.00	50.18	50.37
7	56.85	57.06	57.27	57.48	57.69	57.91	58.12	58.33	58.55	58.76
8	64.97	65.21	65.45	65.69	65.94	66.18	66.42	66.67	66.91	67.15
9	73.09	73.36	73.63	73.91	74.18	74.45	74.72	75.00	75.27	75.55
10	81.21	81.51	81.82	82.12	82.42	82.72	83.03	83.33	83.64	83.94
11	89.34	89.67	90.00	90.33	90.66	91.00	91.33	91.67	92.00	92.34
12	97.46	97.82	98.18	98.54	98.90	99.27	99.63	100.00	100.37	100.73
13	105.58	105.97	106.36	106.75	107.15	107.54	107.94	108.33	108.73	109.13
14	113.70	114.12	114.54	114.96	115.39	115.81	116.24	116.67	117.09	117.52
15	121.82	122.27	122.72	123.18	123.63	124.09	124.54	125.00	125.46	125.91
16	129.94	130.42	130.91	131.35	131.87	132.36	132.84	133.33	133.82	134.31
17	138.06	138.58	139.09	139.60	140.12	140.63	141.15	141.67	142.18	142.70
18	146.18	146.73	147.27	147.81	148.36	148.90	149.45	150.00	150.55	151.10
19	154.31	154.88	155.45	156.02	156.60	157.18	157.75	158.33	158.91	159.49
20	162.43	163.03	163.63	164.24	164.84	165.45	166.06	166.67	167.27	167.89
21	170.55	171.18	171.81	172.45	173.08	173.72	174.36	175.00	175.64	176.28
22	178.67	179.33	179.99	180.66	181.33	181.99	182.66	183.33	184.00	184.67
23	186.79	187.48	188.18	188.87	189.57	190.26	190.96	191.67	192.37	193.07
24	194.91	195.64	196.36	197.08	197.81	198.54	199.27	200.00	200.73	201.46
25	203.03	203.79	204.54	205.29	206.05	206.81	207.57	208.33	209.09	209.86
26	211.16	211.94	212.72	213.51	214.29	215.08	215.87	216.67	217.46	218.25
27	219.28	220.09	220.90	221.72	222.54	223.35	224.18	225.00	225.82	226.65
28	227.40	228.24	229.08	229.93	230.78	231.63	232.48	233.33	234.19	235.04
29	235.52	236.39	237.27	238.14	239.02	239.90	240.78	241.67	242.55	243.43
30	243.64	244.54	245.45	246.35	247.26	248.17	249.08	250.00	250.91	251.83
31	251.76	252.70	253.63	254.57	255.50	256.44	257.39	258.33	259.28	260.21

	.55	1.	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.84	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.87	0.87
.2	1.68	1.69	1.70	1.70	1.71	1.72	1.72	1.73	1.73	1.74
.3	2.53	2.54	2.55	2.55	2.56	2.57	2.58	2.59	2.60	2.61
.4	3.37	3.38	3.39	3.41	3.42	3.43	3.44	3.46	3.47	3.48
.5	4.21	4.23	4.24	4.26	4.27	4.29	4.30	4.32	4.34	4.35
.6	5.05	5.07	5.09	5.11	5.13	5.15	5.16	5.18	5.20	5.22
.7	5.90	5.92	5.94	5.96	5.98	6.00	6.03	6.05	6.07	6.09
.8	6.74	6.76	6.79	6.81	6.84	6.86	6.89	6.91	6.94	6.96
.9	7.58	7.61	7.64	7.67	7.69	7.72	7.75	7.78	7.80	7.83
Area	8.42	8.46	8.49	8.52	8.55	8.58	8.61	8.64	8.67	8.70
2	16.85	16.91	16.97	17.03	17.10	17.16	17.22	17.28	17.34	17.41
3	25.27	25.37	25.46	25.55	25.64	25.74	25.83	25.93	26.02	26.11
4	33.70	33.82	33.94	34.07	34.19	34.31	34.44	34.56	34.69	34.81
5	42.12	42.28	42.43	42.59	42.74	42.89	43.05	43.20	43.36	43.51
6	50.55	50.73	50.92	51.10	51.29	51.47	51.66	51.84	52.03	52.22
7	58.97	59.19	59.40	59.62	59.84	60.05	60.27	60.48	60.70	60.92
8	67.40	67.64	67.89	68.14	68.38	68.63	68.88	69.13	69.37	69.62
9	75.82	76.10	76.38	76.65	76.93	77.21	77.49	77.77	78.05	78.33
10	84.25	84.56	84.86	85.17	85.48	85.79	86.10	86.41	86.72	87.03
11	92.67	93.01	93.35	93.69	94.03	94.37	94.71	95.05	95.39	95.73
12	101.01	101.47	101.84	102.20	102.59	102.95	103.32	103.69	104.05	104.43
13	109.52	109.92	110.32	110.72	111.12	111.52	111.93	112.33	112.73	113.14
14	117.95	118.38	118.81	119.24	119.67	120.10	120.54	120.97	121.40	121.84
15	126.37	126.83	127.29	127.76	128.23	128.68	129.15	129.61	130.08	130.54
16	134.80	135.29	135.78	136.27	136.77	137.26	137.75	138.25	138.75	139.25
17	143.22	143.74	144.27	144.79	145.32	145.84	146.36	146.89	147.42	147.95
18	151.65	152.20	152.75	153.31	153.85	154.41	154.97	155.53	156.09	156.65
19	160.07	160.66	161.24	161.82	162.41	163.00	163.58	164.17	164.76	165.35
20	168.50	169.11	169.73	170.34	170.96	171.58	172.19	172.81	173.44	174.06
21	176.92	177.57	178.21	178.86	179.51	180.15	180.80	181.45	182.11	182.76
22	185.35	186.02	186.70	187.38	188.05	188.73	189.41	190.10	190.78	191.46
23	193.77	194.48	195.18	195.89	196.60	197.31	198.02	198.74	199.45	200.17
24	202.20	202.93	203.67	204.41	205.15	205.89	206.63	207.38	208.12	208.87
25	210.62	211.39	212.16	212.93	213.70	214.47	215.24	216.02	216.79	217.57
26	219.05	219.85	220.64	221.44	222.25	223.05	223.85	224.66	225.47	226.28
27	227.47	228.30	229.13	229.96	230.79	231.63	232.46	233.30	234.14	234.98
28	235.90	236.76	237.62	238.48	239.34	240.21	241.07	241.94	242.81	243.68
29	244.32	245.21	246.10	247.00	247.89	248.78	249.68	250.58	251.48	252.38
30	252.75	253.67	254.59	255.51	256.44	257.36	258.29	259.22	260.15	261.09
31	261.17	262.12	263.08	264.03	264.98	265.94	266.90	267.85	268.83	269.97

	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.87	0.88	0.88	0.88	0.89	0.89	0.85	0.90	0.90	0.90
.2	1.75	1.75	1.76	1.77	1.77	1.78	1.78	1.79	1.80	1.80
.3	2.62	2.63	2.64	2.65	2.66	2.67	2.68	2.69	2.70	2.70
.4	3.49	3.51	3.52	3.53	3.54	3.56	3.57	3.58	3.59	3.61
.5	4.37	4.38	4.40	4.41	4.43	4.45	4.46	4.48	4.49	4.51
.6	5.24	5.26	5.28	5.30	5.32	5.33	5.35	5.37	5.39	5.41
.7	6.11	6.14	6.16	6.18	6.20	6.22	6.25	6.27	6.29	6.31
.8	6.99	7.01	7.04	7.06	7.09	7.11	7.14	7.16	7.15	7.21
.9	7.86	7.89	7.92	7.94	7.97	8.00	8.03	8.06	8.09	8.12
Area	8.73	8.77	8.80	8.83	8.86	8.89	8.92	8.95	8.99	9.02
2	17.47	17.53	17.59	17.65	17.72	17.78	17.84	17.91	17.97	18.03
3	26.20	26.30	26.39	26.48	26.58	26.67	26.77	26.86	26.96	27.05
4	34.94	35.06	35.18	35.31	35.44	35.56	35.69	35.81	35.94	36.07
5	43.67	43.83	43.98	44.14	44.30	44.45	44.61	44.77	44.93	45.09
6	52.40	52.59	52.78	52.97	53.16	53.34	53.53	53.72	53.91	54.10
7	61.14	61.36	61.58	61.80	62.01	62.23	62.46	62.68	62.90	63.12
8	69.87	70.12	70.37	70.62	70.87	71.13	71.38	71.63	71.88	72.14
9	78.61	78.89	79.17	79.45	79.73	80.02	80.30	80.58	80.87	81.15
10	87.34	87.65	87.97	88.28	88.59	88.91	89.22	89.54	89.85	90.17
11	96.07	96.42	96.76	97.11	97.45	97.80	98.14	98.49	98.84	99.19
12	104.81	105.18	105.56	105.93	106.31	106.69	107.07	107.45	107.82	108.20
13	113.54	113.95	114.36	114.76	115.17	115.58	115.99	116.40	116.81	117.22
14	122.28	122.71	123.15	123.59	124.03	124.47	124.91	125.35	125.80	126.24
15	131.01	131.48	131.95	132.42	132.89	133.36	133.83	134.31	134.78	135.26
16	139.75	140.24	140.75	141.25	141.75	142.25	142.75	143.26	143.77	144.27
17	148.48	149.01	149.54	150.07	150.61	151.14	151.68	152.21	152.75	153.29
18	157.21	157.78	158.34	158.90	159.47	160.03	160.60	161.17	161.74	162.31
19	165.95	166.54	167.14	167.73	168.33	168.92	169.52	170.12	170.72	171.32
20	174.68	175.31	175.93	176.56	177.19	177.81	178.44	179.08	179.71	180.34
21	183.42	184.07	184.73	185.39	186.04	186.70	187.37	188.03	188.69	189.36
22	192.15	192.84	193.52	194.21	194.90	195.60	196.29	196.98	197.68	198.38
23	200.88	201.60	202.32	203.04	203.76	204.49	205.21	205.94	206.66	207.39
24	209.62	210.37	211.12	211.87	212.62	213.38	214.13	214.89	215.65	216.41
25	218.35	219.13	219.91	220.70	221.48	222.27	223.05	223.84	224.63	225.43
26	227.09	227.90	228.71	229.53	230.34	231.16	231.98	232.80	233.62	234.44
27	235.82	236.66	237.51	238.35	239.20	240.05	240.90	241.75	242.61	243.46
28	244.55	245.43	246.30	247.18	248.06	248.94	249.82	250.71	251.59	252.48
29	253.29	254.19	255.10	256.01	256.92	257.83	258.74	259.66	260.58	261.50
30	262.02	262.96	263.90	264.84	265.78	266.72	267.67	268.61	269.56	270.51
31	270.76	271.72	272.69	273.66	274.64	275.61	276.59	277.57	278.55	279.53

Cylinders in Ale-Gallons.

	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.90	0.91	0.91	0.91	0.92	0.93	0.92	0.93	0.93
.2	1.81	1.82	1.82	1.83	1.83	1.84	1.85	1.86	2.87
.3	2.71	2.72	2.73	2.74	2.74	2.76	2.77	2.78	2.79	1.80
.4	3.62	3.63	3.64	3.66	3.67	3.68	3.70	3.71	3.72	3.73
.5	4.52	4.54	4.56	4.57	4.59	4.60	4.62	4.64	4.65	4.67
.6	5.43	5.45	5.47	5.49	5.51	5.52	5.54	5.56	5.58	5.60
.7	6.33	6.36	6.38	6.40	6.42	6.45	6.47	6.49	6.51	6.54
.8	7.24	7.26	7.29	7.32	7.34	7.37	7.39	7.42	7.44	7.47
.9	8.14	8.17	8.20	8.23	8.26	8.29	8.32	8.34	8.37	8.40
Area	9.05	9.08	9.11	9.14	9.18	9.21	9.24	9.27	9.30	9.34
2	18.10	18.16	18.22	18.29	18.35	18.42	18.48	18.54	18.61	18.67
3	27.15	27.24	27.34	27.43	27.53	27.62	27.72	27.82	27.91	28.01
4	36.19	36.32	36.45	36.58	36.70	36.83	36.96	37.09	37.22	37.35
5	45.24	45.40	45.56	45.72	45.88	46.04	46.20	46.36	46.52	46.68
6	54.29	54.48	54.67	54.87	55.06	55.25	55.44	55.63	55.83	56.02
7	63.34	63.56	63.79	64.01	64.23	64.46	64.68	64.91	65.13	65.36
8	72.39	72.64	72.90	73.15	73.41	73.67	73.92	74.18	74.44	74.69
9	81.44	81.73	82.01	82.30	82.59	82.87	83.16	83.45	83.74	84.03
10	90.49	90.81	91.12	91.44	91.76	92.08	92.40	92.72	93.05	93.37
11	99.54	99.89	100.24	100.59	100.94	101.29	101.64	102.00	102.35	102.70
12	108.59	108.97	109.35	109.73	110.11	110.50	110.88	111.27	111.65	112.04
13	117.63	118.05	118.46	118.88	119.29	119.71	120.12	120.54	120.96	121.38
14	126.68	127.13	127.57	128.02	128.47	128.91	129.36	129.81	130.26	130.71
15	135.73	136.21	136.69	137.16	137.64	138.12	138.60	139.09	139.57	140.05
16	144.78	145.29	145.80	146.31	146.82	147.33	147.84	148.36	148.87	149.39
17	153.83	154.37	154.91	155.45	156.00	156.54	157.09	157.63	158.18	158.73
18	162.88	163.45	164.02	164.60	165.17	165.75	166.33	166.90	167.48	168.06
19	171.93	172.53	173.14	173.74	174.35	174.96	175.57	176.18	176.79	177.40
20	180 98	181.51	182.15	182.89	183.52	184.16	184.81	185.45	186.09	186.74
21	190.02	190.69	191.36	192.03	192.70	193.37	194.05	194.72	195.40	196.07
22	199.07	199.77	200.47	201.17	201.88	202.58	203.25	203.99	204.70	205.41
23	208.12	208.85	209.58	210.32	211.05	211.79	212.53	213.27	214.01	214.75
24	217.17	217.93	218.70	219.46	220.23	221.00	221.77	222.54	223.31	224.08
25	226.22	227.01	227.81	228.61	229.40	230.21	231.01	231.81	232.61	233.42
26	235.27	236.10	236.92	237.75	238.58	239.41	240.25	241.08	241.92	242.76
27	244.32	245.18	246.03	246.90	247.76	248.62	249.49	250.35	251.22	252.09
28	253.37	254.26	255.15	256.04	256.93	257.83	258.73	259.63	260.53	261.43
29	262.41	263.34	264.26	265.18	266.11	267.04	267.97	268.90	269.83	270.77
30	271.46	272.42	273.37	274.33	275.29	276.25	277.21	278.17	279.14	280.10
31	280.51	281.50	282.48	283.47	284.46	285.45	286.45	287.44	288.44	289.44

Cylinders in Ale-Gallons.

	.8	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	0.94	0.94	0.94	0.95	0.95	0.95	0.96	0.96	0.96	0.97
.2	1.87	1.88	1.89	1.89	1.90	1.91	1.91	1.92	1.93	1.93
.3	2.81	2.82	2.83	2.84	2.85	2.86	2.87	2.88	2.89	2.90
.4	3.75	3.76	3.77	3.79	3.80	3.81	3.83	3.84	3.85	3.86
.5	4.68	4.70	4.72	4.73	4.75	4.77	4.78	4.80	4.81	4.83
.6	5.42	5.64	5.66	5.68	5.70	5.72	5.74	5.76	5.78	5.80
.7	6.56	6.58	6.60	6.63	6.65	6.67	6.69	6.72	6.74	6.76
.8	7.50	7.52	7.55	7.57	7.60	7.62	7.65	7.68	7.70	7.73
.9	8.43	8.46	8.49	8.52	8.55	8.58	8.61	8.64	8.67	8.70
Area	9.37	9.40	9.43	9.47	9.50	9.53	9.56	9.60	9.63	9.66
2	18.74	18.80	18.87	18.93	19.00	19.06	19.13	19.19	19.26	19.32
3	28.11	28.20	28.30	28.40	28.50	28.59	28.69	28.79	28.89	28.99
4	37.48	37.61	37.73	37.86	37.99	38.12	38.26	38.39	38.52	38.65
5	46.85	47.01	47.17	47.33	47.49	47.66	47.82	47.98	48.15	48.31
6	56.21	56.41	56.60	56.80	56.99	57.19	57.38	57.58	57.78	57.97
7	65.58	65.81	66.04	66.26	66.49	66.72	66.95	67.18	67.40	67.63
8	74.95	75.21	75.47	75.73	75.99	76.25	76.51	76.77	77.03	77.30
9	84.32	84.61	84.90	85.20	85.49	85.78	86.07	86.37	86.66	86.96
10	93.69	94.01	94.34	94.66	94.99	95.31	95.64	95.97	96.29	96.62
11	103.06	103.42	103.77	104.13	104.49	104.84	105.20	105.56	105.92	106.28
12	112.43	112.82	113.21	113.59	113.99	114.38	114.77	115.16	115.55	115.94
13	121.80	122.22	122.64	123.06	123.48	123.91	124.33	124.76	125.18	125.61
14	131.17	131.62	132.07	132.53	132.98	133.44	133.89	134.35	134.81	135.27
15	140.54	141.02	141.51	141.99	142.48	142.97	143.46	143.95	144.44	144.93
16	149.91	150.42	150.94	151.46	151.98	152.50	153.02	153.55	154.07	154.55
17	159.27	159.82	160.37	160.93	161.48	162.03	162.59	163.14	163.70	164.26
18	168.64	169.22	169.81	170.39	170.98	171.56	172.15	172.74	173.33	173.92
19	178.01	178.63	179.24	179.86	180.48	181.09	181.71	182.34	182.96	183.58
20	187.38	188.03	188.68	189.32	189.98	190.63	191.28	191.93	192.59	193.24
21	196.75	197.43	198.11	198.79	199.47	200.16	200.84	201.53	202.22	202.90
22	206.12	206.83	207.54	208.26	208.97	209.69	210.41	211.12	211.84	212.57
23	215.49	216.23	216.98	217.72	218.47	219.22	219.97	220.72	221.47	222.23
24	224.86	225.63	226.41	227.19	227.97	228.75	229.53	230.31	231.10	231.89
25	234.23	235.03	235.84	236.65	237.47	238.28	239.10	239.91	240.73	241.55
26	243.60	244.44	245.28	246.12	246.97	247.81	248.66	249.51	250.36	251.21
27	252.97	253.84	254.71	255.59	256.47	257.34	258.23	259.11	259.99	260.88
28	262.33	263.24	264.15	265.05	265.97	266.88	267.79	268.70	269.62	270.54
29	271.70	272.64	273.58	274.52	275.46	276.41	277.35	278.30	279.25	280.20
30	281.07	282.04	283.01	283.99	284.96	285.94	286.92	287.90	288.88	289.86
31	290.44	291.44	292.45	293.44	294.46	295.47	296.48	297.49	298.51	299.52

	,91	,92	,93	,94	,95	,96	,97	,98	,99	1,00
,1	0,97	0,97	0,98	0,98	0,98	0,99	0,99	0,99	1,00	1,0
,2	1,94	1,95	0,95	1,96	1,97	1,97	1,98	1,99	1,99	2,0
,3	2,91	2,92	2,93	2,94	2,95	2,96	2,97	2,98	2,99	3,0
,4	3,88	3,89	3,90	3,91	3,93	3,94	3,96	3,97	3,98	4,0
,5	4,85	4,86	4,88	4,90	4,91	4,93	4,95	4,96	4,98	5,0
,6	5,82	5,84	5,86	5,88	5,90	5,92	5,94	5,96	5,98	6,0
,7	6,79	6,81	6,83	6,86	6,88	6,90	6,92	6,95	6,97	6,99
,8	7,76	7,78	7,81	7,83	7,86	7,89	7,91	7,94	7,97	7,99
,9	8,73	8,75	8,78	8,81	8,84	8,87	8,90	8,93	8,96	8,99
Area	9,69	9,73	9,76	9,79	9,83	9,86	9,89	9,93	9,96	9,99
2	19,39	19,46	19,52	19,59	19,65	19,72	19,79	19,85	19,93	19,99
3	29,08	29,18	29,28	29,38	29,48	29,58	29,68	29,78	29,88	29,98
4	38,78	38,91	39,04	39,17	39,31	39,44	39,57	39,70	39,84	39,97
5	48,47	48,64	48,80	48,97	49,13	49,30	49,47	49,63	49,80	49,96
6	58,17	58,37	58,56	58,76	58,96	59,16	59,36	59,56	59,76	59,96
7	67,86	68,09	68,33	68,56	68,79	69,02	69,25	69,48	69,72	69,95
8	77,56	77,82	78,09	78,35	78,61	78,88	79,14	79,41	79,68	79,94
9	87,25	87,55	87,85	88,14	88,44	88,74	89,04	89,34	89,64	89,94
10	96,95	97,28	97,61	97,94	98,27	98,60	98,93	99,26	99,60	99,93
11	106,64	107,01	107,37	107,73	108,09	108,46	108,82	109,19	109,55	109,92
12	116,34	116,73	117,13	117,53	117,92	118,32	118,72	119,11	119,52	119,92
13	126,03	126,46	126,89	127,32	127,75	128,18	128,61	129,04	129,48	129,91
14	135,73	136,19	136,65	137,11	137,57	138,04	138,50	138,97	139,43	139,90
15	145,42	145,92	146,41	146,91	147,40	147,90	148,40	148,89	149,39	149,89
16	155,12	155,64	156,17	156,70	157,23	157,76	158,29	158,82	159,35	159,89
17	164,81	165,37	165,93	166,49	167,06	167,62	168,18	168,75	169,31	169,88
18	174,51	175,10	175,69	176,29	176,88	177,48	178,08	178,67	179,27	179,87
19	184,20	184,83	185,45	186,08	186,71	187,34	187,97	188,60	189,23	189,87
20	193,90	194,56	195,22	195,88	196,54	197,20	197,86	198,53	199,19	199,86
21	203,59	204,28	204,98	205,67	206,36	207,06	207,75	208,45	209,15	209,85
22	213,29	214,01	214,74	215,46	216,19	216,92	219,65	218,38	219,11	219,85
23	222,98	223,74	224,50	225,26	226,02	226,78	227,54	228,30	229,07	229,84
24	232,68	233,47	234,26	235,05	235,84	236,64	237,43	238,23	239,03	239,83
25	242,37	243,19	244,02	244,84	245,67	246,50	247,33	248,16	248,99	249,82
26	252,07	252,92	253,78	254,64	255,50	256,36	257,22	258,08	258,95	259,82
27	261,76	262,65	263,54	264,43	265,32	266,22	267,11	268,01	268,91	269,81
28	271,49	272,38	273,30	274,23	275,15	276,08	277,01	277,94	278,87	279,80
29	281,15	282,11	283,06	284,02	284,98	285,94	286,90	287,86	288,83	289,90
30	290,85	291,83	292,82	293,81	294,81	295,80	296,79	297,79	298,79	299,79
31	300,54	301,56	302,58	303,61	304,63	305,66	306,69	307,72	308,75	309,78

	60	.1	.2	.3	.4	.5	.6	.7	.8	.9
.1	1.0	1.01	1.01	1.01	1.02	1.02	1.02	1.03	1.03	1.03
.2	2.01	2.01	2.02	2.03	2.03	2.04	2.05	2.05	2.06	2.07
.3	3.01	3.02	3.03	3.04	3.05	3.06	3.07	3.08	3.09	3.10
.4	4.01	4.02	4.04	4.05	4.06	4.08	4.09	4.10	4.12	4.13
.5	5.01	5.03	5.05	5.06	5.08	5.10	5.11	5.13	5.15	5.16
.6	6.02	6.04	6.06	6.08	6.10	6.12	6.14	6.16	6.18	6.20
.7	7.02	7.04	7.07	7.09	7.11	7.14	7.16	7.18	7.21	7.23
.8	8.02	8.05	8.07	8.10	8.13	8.16	8.18	8.21	8.24	8.26
.9	9.02	9.05	9.08	9.11	9.14	9.17	9.20	9.24	9.27	9.29
Area	10.03	10.06	10.09	10.13	10.16	10.19	10.23	10.26	10.30	10.33
2	20.05	20.12	20.19	20.25	20.32	20.39	20.46	20.52	20.59	20.66
3	30.08	30.18	30.28	30.38	30.48	30.58	30.68	30.78	30.89	30.99
4	40.11	40.24	40.37	40.51	40.64	40.78	40.91	41.05	41.18	41.32
5	50.13	50.30	50.47	50.63	50.80	50.97	51.14	51.31	51.48	51.65
6	60.16	60.36	60.56	60.76	60.96	61.17	61.37	61.57	61.77	61.98
7	70.18	70.42	70.65	70.89	71.12	71.36	71.60	71.83	72.07	72.31
8	80.21	80.48	80.75	80.01	81.28	81.55	81.82	82.09	82.36	82.64
9	90.24	90.54	90.84	91.14	91.44	91.75	92.05	92.35	92.66	92.96
10	100.26	100.60	100.93	101.27	101.60	101.94	102.28	102.62	102.95	103.29
11	110.29	110.66	111.03	111.40	111.77	112.14	112.51	112.88	113.25	113.62
12	120.32	120.72	121.12	121.52	121.93	122.33	122.73	123.14	123.55	123.95
13	130.34	130.78	131.21	131.65	132.09	132.52	132.96	133.40	133.84	134.28
14	140.37	140.84	141.31	141.78	142.25	142.72	143.19	143.66	144.14	144.61
15	150.40	150.90	151.40	151.90	152.41	152.91	153.42	153.93	154.43	154.94
16	160.42	160.96	161.49	162.03	162.57	163.11	163.65	164.19	164.73	165.27
17	170.45	171.02	171.59	172.16	172.73	173.30	173.87	174.45	175.02	175.60
18	180.47	181.08	181.68	182.28	182.89	183.50	184.10	184.71	185.31	185.93
19	190.50	191.14	191.77	192.41	193.05	193.69	194.33	194.97	195.61	196.26
20	200.53	201.20	201.87	202.54	203.21	203.88	204.56	205.23	205.91	206.59
21	210.55	211.26	211.96	212.66	213.37	214.08	214.79	215.50	216.21	216.92
22	220.58	221.32	222.05	222.79	223.53	224.27	225.11	225.76	226.50	227.25
23	230.61	231.38	232.15	232.92	233.69	234.47	235.24	236.02	236.80	237.58
24	240.63	241.43	242.24	243.05	243.85	244.66	245.47	246.28	247.09	247.91
25	250.66	251.49	252.33	253.17	254.01	254.85	255.70	256.54	257.39	258.24
26	260.69	261.55	262.43	263.30	264.17	265.05	265.93	266.80	267.68	268.56
27	270.71	271.61	272.52	273.43	274.33	275.24	276.15	277.07	277.98	278.89
28	280.74	281.67	282.61	283.55	284.49	285.44	286.38	287.33	288.27	289.22
29	390.77	291.73	292.71	293.68	294.65	295.63	296.61	297.59	298.57	299.55
30	300.79	301.79	302.08	303.81	304.81	305.83	306.84	307.85	308.86	309.88
31	310.82	311.85	312.89	313.93	314.98	316.02	317.06	318.11	319.16	320.21

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